FINAL

Long-Term Monitoring Annual Groundwater Report SWMU 66

Prepared For

81 CES /CEVR Keesler Air Force Base, Mississippi



Air Education and Training Command Randolph Air Force Base, Texas

Contract No. F41689-96-D-0710

Delivery Order 5057

Prepared By

PARSONS ENGINEERING SCIENCE, INC. Atlanta, Georgia

January 2000 735524



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1. REPORT DATE 00 JAN 2000		2. REPORT TYPE N/A		3. DATES COVERED			
4. TITLE AND SUBTITLE				5a. CONTRACT	NUMBER		
U	Monitoring Annual (esler AFB, Mississi)	-	rt, SWMU 66,	5b. GRANT NUMBER			
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6. AUTHOR(S)				5d. PROJECT NU	JMBER		
				5e. TASK NUMB	ER		
				5f. WORK UNIT	NUMBER		
	ZATION NAME(S) AND AE ng Science, Inc., 170	` '	000, Denver,	8. PERFORMING REPORT NUMB	GORGANIZATION ER		
9. SPONSORING/MONITO	RING AGENCY NAME(S) A	AND ADDRESS(ES)		10. SPONSOR/M	ONITOR'S ACRONYM(S)		
				11. SPONSOR/MONITOR'S REPORT NUMBER(S)			
12. DISTRIBUTION/AVAIL Approved for publ	LABILITY STATEMENT ic release, distributi	on unlimited					
13. SUPPLEMENTARY NO The original docum	otes nent contains color i	mages.					
14. ABSTRACT							
15. SUBJECT TERMS							
16. SECURITY CLASSIFIC	CATION OF:	17. LIMITATION OF	18. NUMBER	19a. NAME OF			
a. REPORT unclassified	b. ABSTRACT unclassified	c. THIS PAGE unclassified	ABSTRACT UU	OF PAGES 509	RESPONSIBLE PERSON		

Report Documentation Page

Form Approved OMB No. 0704-0188

PARSONS ENGINEERING SCIENCE, INC.

A UNIT OF PARSONS INFRASTRUCTURE & TECHNOLOGY GROUP

5390 Triangle Parkway, Suite 100 • Norcross, Georgia 30092 • (770) 446-4900 • Fax: (770) 446-4910

January 11, 2000

Ms. Cindy Hall HQ AETC CONS/LGCU 2021 First Street West Randolph, AFB TX 78150-4320

Dear Ms. Hall:

Contract No. F41689-96-D-0710, Delivery Order 5057, Final Long-Term Subject: Monitoring Reports for Three Sites at Keesler Air Force Base, Mississippi

Parsons Engineering Science, Inc. is pleased to submit the following Final Long-Term Monitoring Reports for Delivery Order 5057:

- Annual Groundwater Sampling Report for SWMU 66
- Quarterly Groundwater Sampling Report for Area of Concern A

These reports were revised based on comments received from USEPA and MDEQ and are being distributed to the personnel listed at the bottom of the page.

If you have any questions regarding these submittals, please contact me at (678) 969-2375.

Sincerely,

PARSONS ENGINEERING SCIENCE, INC.

Walker J. Duncan, P.G.

Project Manager

Lisa Noble (Keesler AFB, 4 copies) Rodney Arnold (AFCEE, 1 copy) Robert Backlund (HQ AETC 1 copy) Bob Merrill (MDEQ, 1 copy) Robert Pope (USEPA, 1 copy)

FINAL LONG-TERM MONITORING ANNUAL GROUNDWATER REPORT SWMU 66

PREPARED FOR:

81 CES / CEVR KEESLER AIR FORCE BASE, MISSISSIPPI

AIR EDUCATION AND TRAINING COMMAND RANDOLPH AIR FORCE BASE, TEXAS

CONTRACT NO. F41689-96-D-0710 DELIVERY ORDER 5057

PREPARED BY:

PARSONS ENGINEERING SCIENCE, INC. 5390 TRIANGLE PARKWAY SUITE 100 NORCROSS, GEORGIA 30092

January 2000

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SECTION 1 INTRODUCTION

1.1 PURPOSE

This annual report documents the results of four quarterly groundwater sampling events performed at solid waste management unit (SWMU) 66 at Keesler Air Force Base (AFB) in Biloxi, Mississippi (Figure 1.1). This report will be used to evaluate the extent and attenuation potential of hydrocarbon contamination in the groundwater at SWMU 66. Quarterly groundwater monitoring is being performed at SWMU 66 to fulfill a Resource Conservation and Recovery Act (RCRA) requirement and is approved by the United States Environmental Protection Agency (USEPA) and the Mississippi Department of Environmental Quality (MDEQ). The location of SWMU 66 is shown on Figure 1.2.

1.2 SITE HISTORY

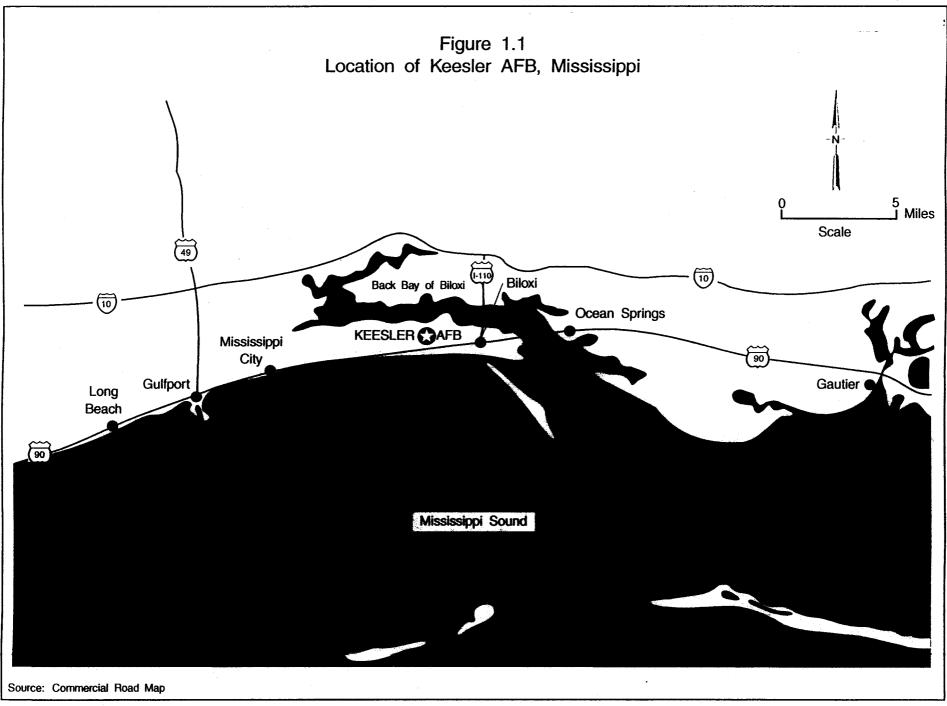
SWMU 66, (Building 4038) is the active military service station (Figure 1.3). An 8000 gallon underground storage tank (UST) was taken out of service and removed from the site in December 1987. Soils containing petroleum hydrocarbons above cleanup criteria were left in place. The site was listed as part of Keesler's corrective action under RCRA and was investigated in 1993. A bioventing study was implemented to remediate soils containing petroleum hydrocarbons under an Air Force Center for Environmental Excellence (AFCEE) bioventing initiative. Three additional USTs at this site were removed in November 1996 and replaced with above ground storage tanks. The site was studied during 1995-96 and recommended for corrective measures that included natural attenuation with monitoring and institutional controls. These corrective measures were approved by USEPA and MDEQ in 1998.

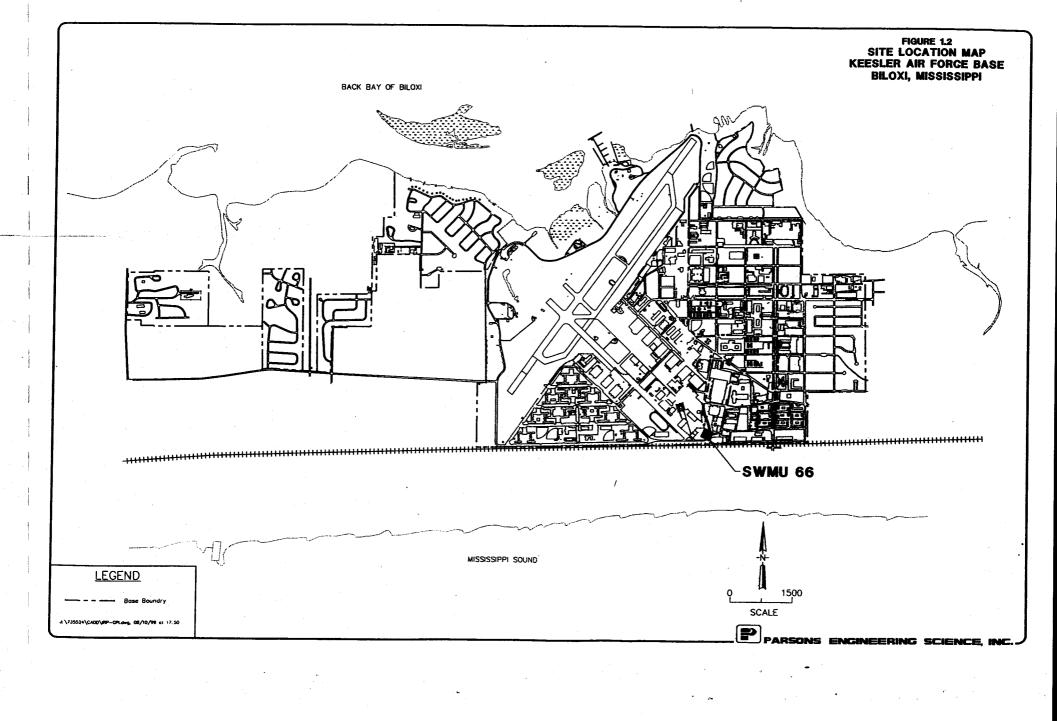
1.3 PROJECT EVENTS

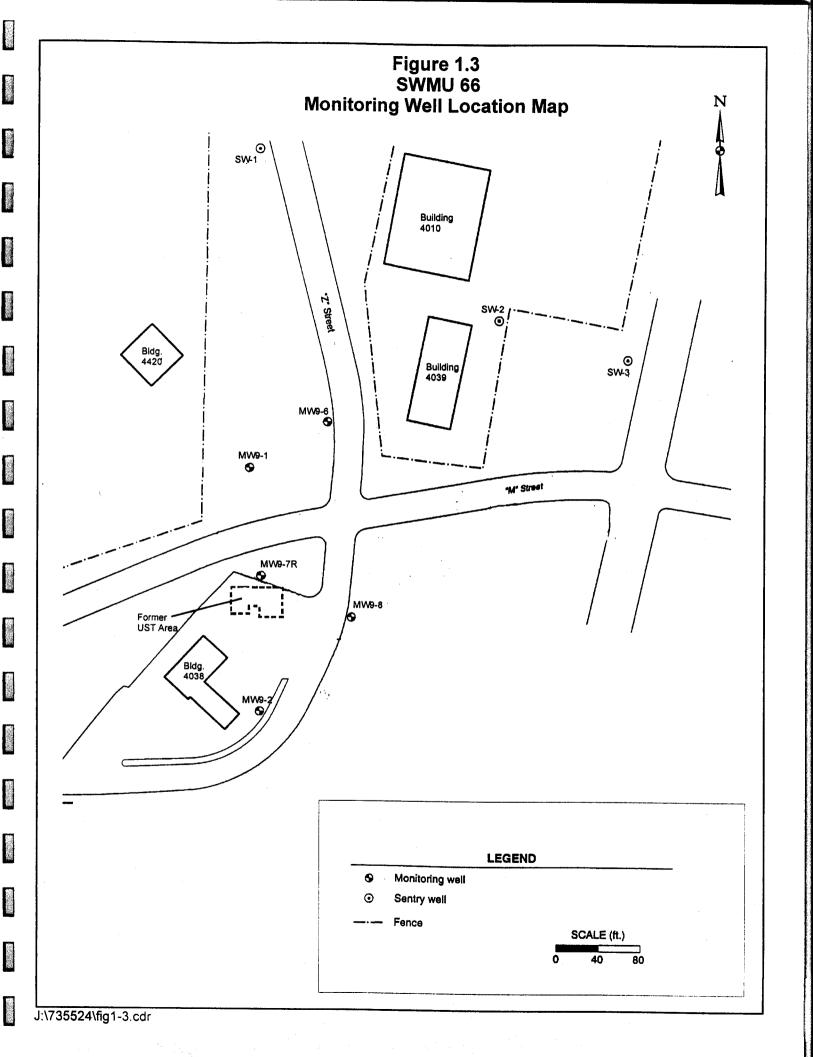
Groundwater sampling was conducted at SWMU 66 on May 14, 1998, August 20, 1998, November 18-19, 1998 and June 22-23, 1999. Seven wells were sampled during the first three events and included four monitoring wells (MW9-1, MW9-2, MW9-6, and MW9-8), and three sentry wells (SW-1, SW-2, SW-3). Well MW9-7, which was included in the long-term monitoring program for SWMU 66 was not sampled as this well had been damaged during construction activities. In June of 1999, a new well was installed to replace damaged well MW9-7. This new well was labeled MW9-7R. For the June 1999 sampling event, a total of eight wells were sampled.

Activities completed during the June 1999 sampling event included the following:

- Monitoring well MW9-7 was replaced with a new well identified as MW9-7R.
- A Peristaltic pump and a Horiba U-10 water quality meter were utilized to purge the wells and obtain field parameters characterizing the groundwater from the surficial aquifer.
- Measurements of monitoring well and sentry well groundwater levels were recorded to develop a potentiometric surface map of groundwater elevations and determine groundwater flow direction.
- Completion of annual groundwater sample collection from monitoring wells and sentry wells, for benzene, toluene, ethylbenzene, xylenes (BTEX), methyltertiary-butylether (MTBE), ammonia, methane, ferrous iron, and sulfate analyses in support of a natural attenuation evaluation.







SECTION 2 MONITORING WELL GAUGING AND SAMPLING RESULTS

2.1 MONITORING WELL GAUGING

Groundwater level measurements were recorded at SWMU 66 on May 15, 1998, August 20, 1998, November 19, 1998, and June 24, 1999 and are provided in Table 2.1. Depth to water on June 24, 1999 ranged from 3.91 to 6.23 feet below top of well casing. Potentiometric surface maps were prepared based on these measurements and are provided as Figures 2.1 through 2.4. Groundwater flow at the site is generally toward the north.

2.2 GROUNDWATER SAMPLING AND ANALYTICAL RESULTS

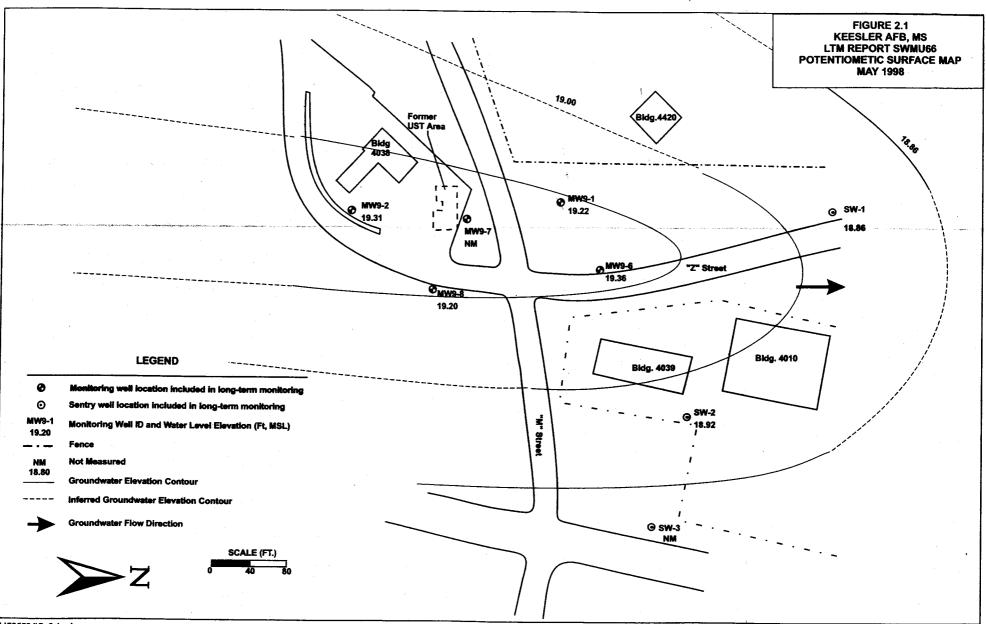
The monitoring wells and sentry wells at SWMU 66 were sampled on May 14, 1998, August 20, 1998, November 18-19, 1998, and June 22-23, 1999. During the June 1999 sampling event, groundwater samples were collected from monitoring wells MW9-1, MW9-2, MW9-6, MW9-7R, MW9-8, and sentry wells SW-1, SW-2, and SW-3. The samples were analyzed for BTEX, MTBE, and methane by an off site laboratory. In addition, on site analysis for ammonia, sulfate, and ferrous iron was conducted to determine the natural attenuation capacity of the surficial aquifer. The analytical results for all four sampling rounds are presented in Table 2.2. The results of the natural attenuation sampling performed in June 1999 are presented in Section 5. The extent of the plume associated with total BTEX in the groundwater from the four sampling periods is shown on Figures 2.5 through 2.8. The associated concentrations of methane, ferrous iron, nitrate, and sulfate in the groundwater are illustrated on Figures 2.9 through 2.11. A discussion of methane, ferrous iron, and sulfate is provided in Section 5. Nitrate was not sampled for in the last quarterly event as it was not detected in the three previous sampling rounds. Laboratory data sheets for this sampling event are presented in Appendix A.

The analysis for BTEX and MTBE was performed by EPA Method 8021B. For the quarterly sampling event conducted in June 1999, BTEX constituents were detected in wells MW9-1, MW9-7R, and MW9-8. The total BTEX concentrations were as follows: MW9-1 (0.008 mg/L), MW9-7R (0.271 mg/L), and MW9-8 (0.490 mg/L). MTBE was detected in well MW9-7R at a concentration of 0.0016 mg/L.

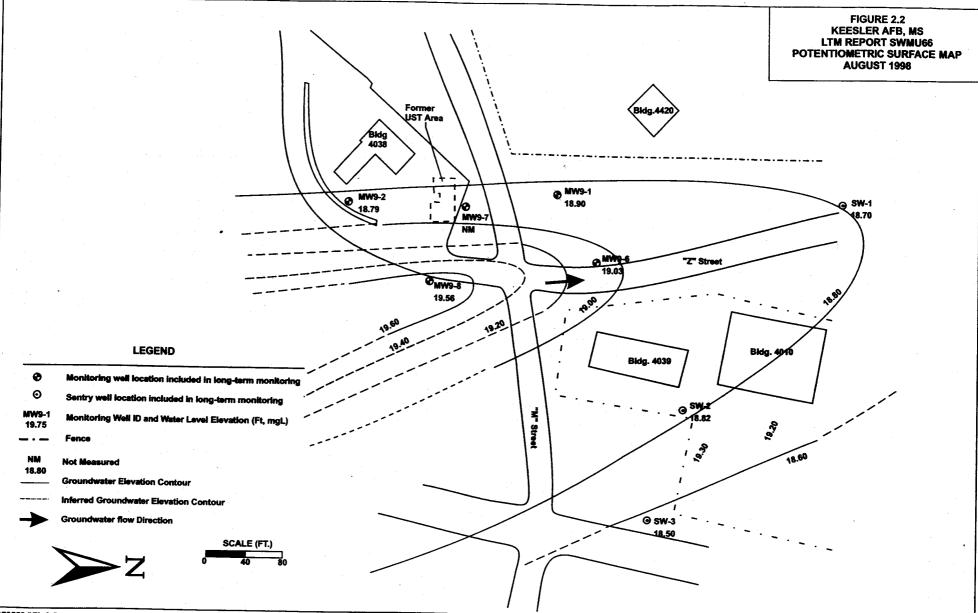
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2.3 FIELD DETERMINED PARAMETERS

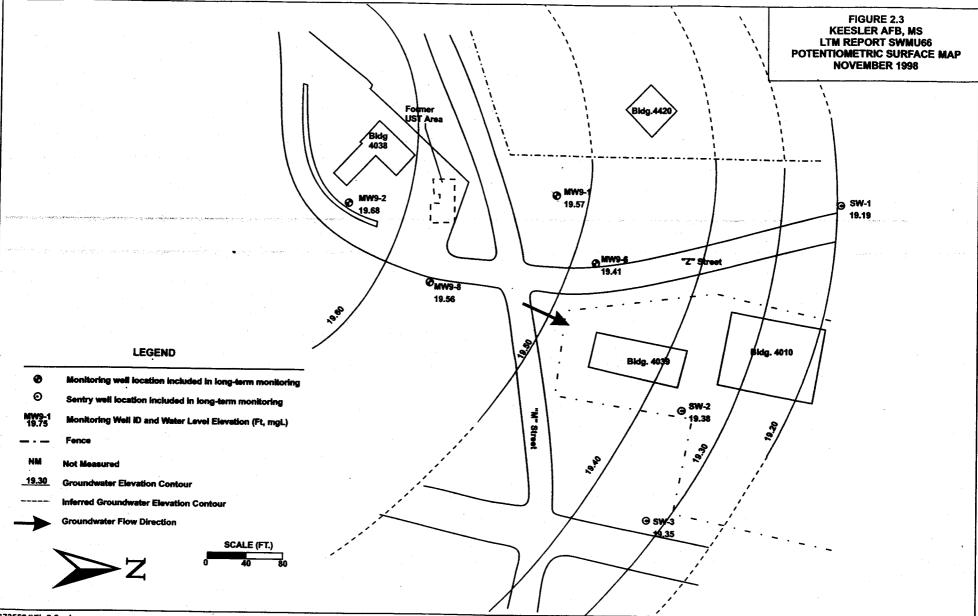
Various parameters measured in the field during well purging activities included temperature, conductivity, pH, and dissolved oxygen. These parameters are summarized in Table 2.3. The values in this table represent the last reading recorded after stabilization of purging parameters. Groundwater sampling records/forms are presented in Appendix B.



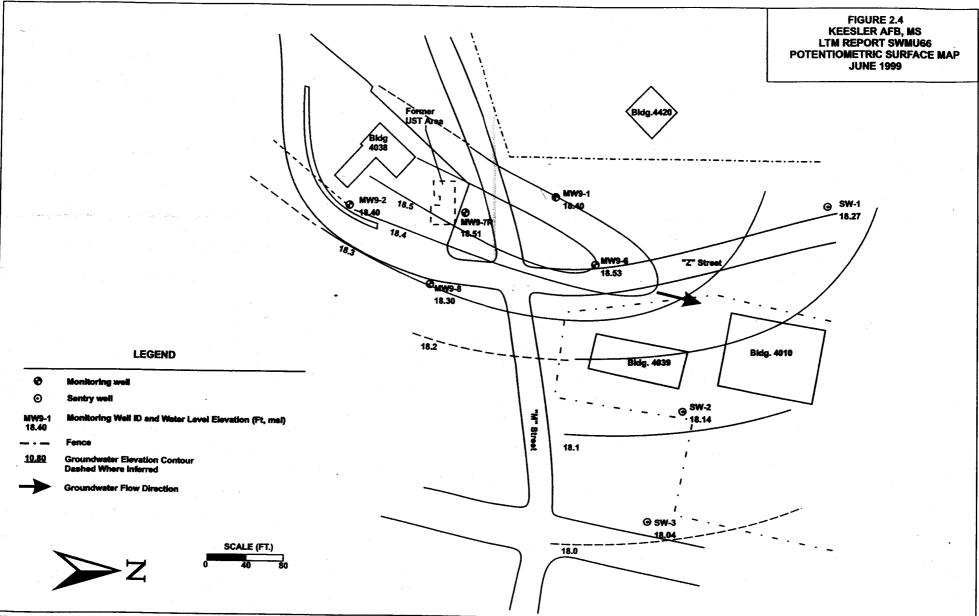
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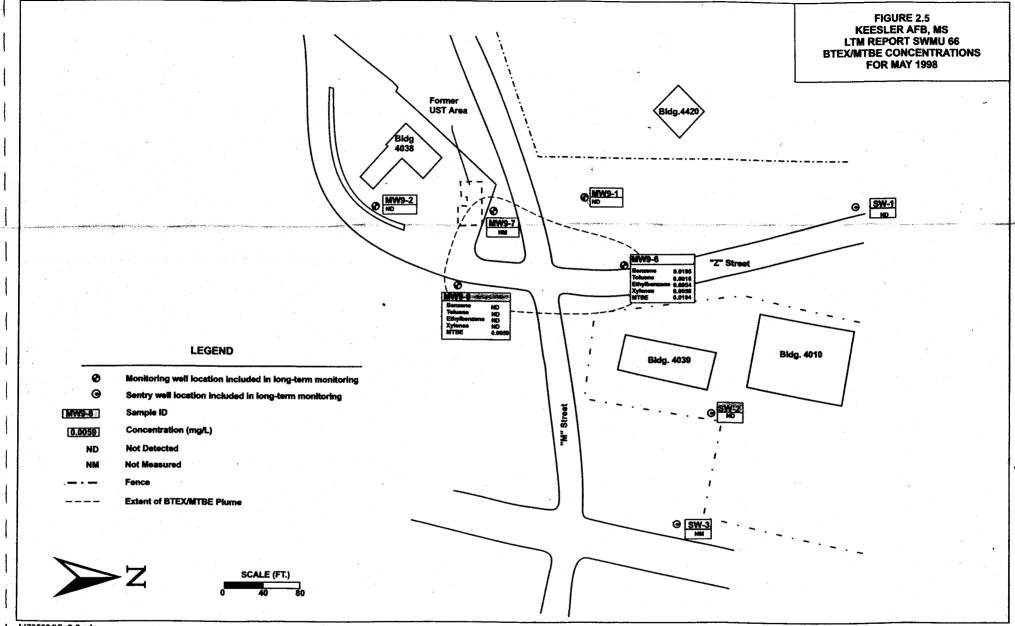
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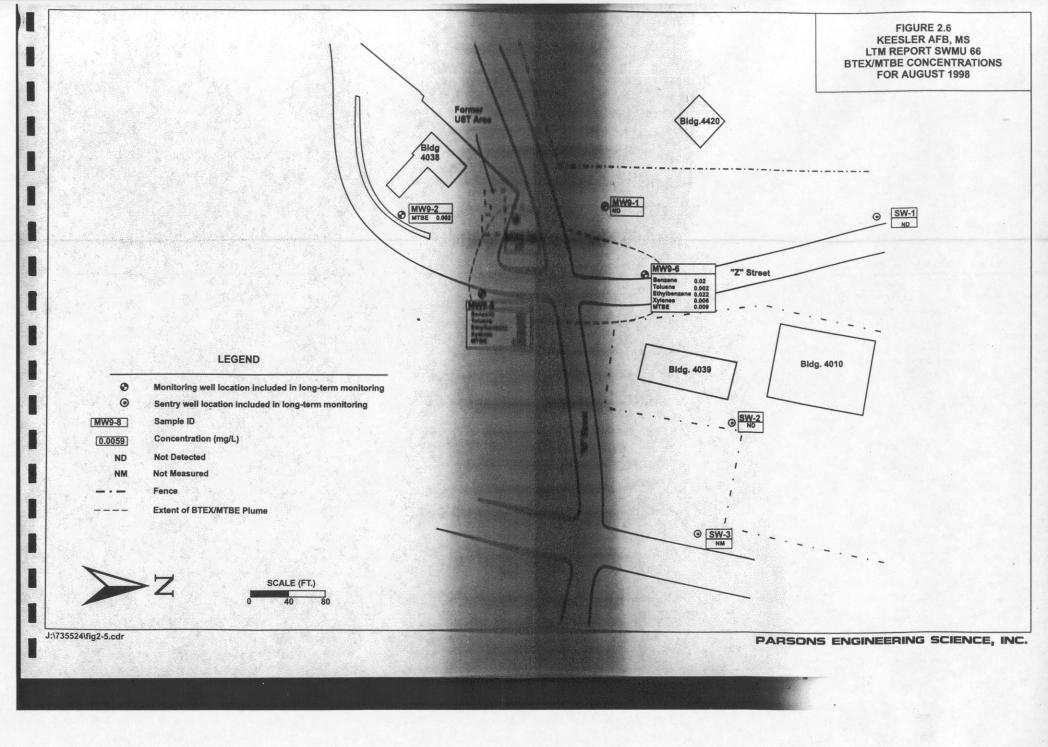
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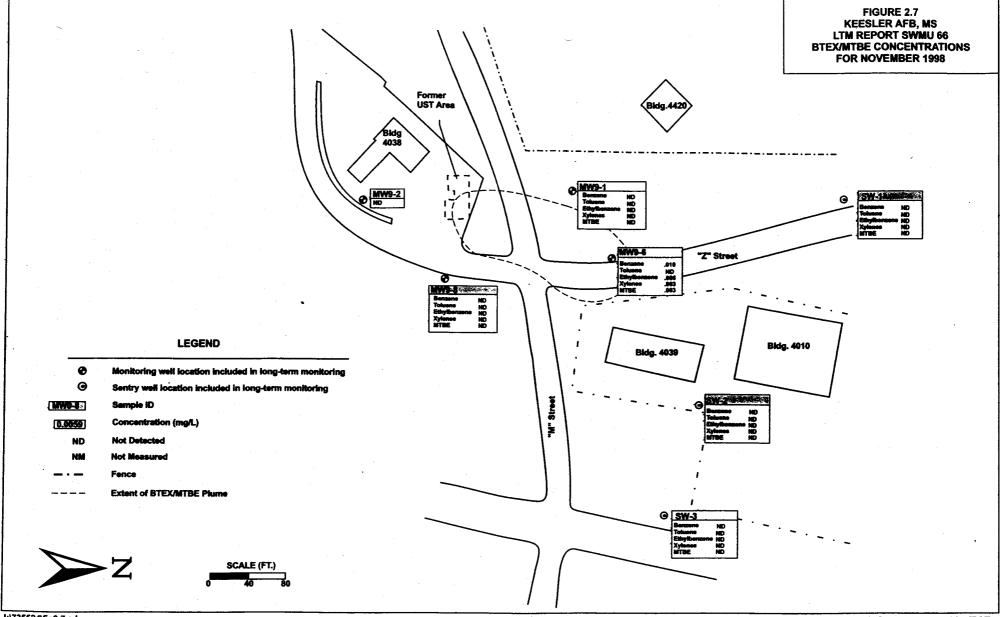


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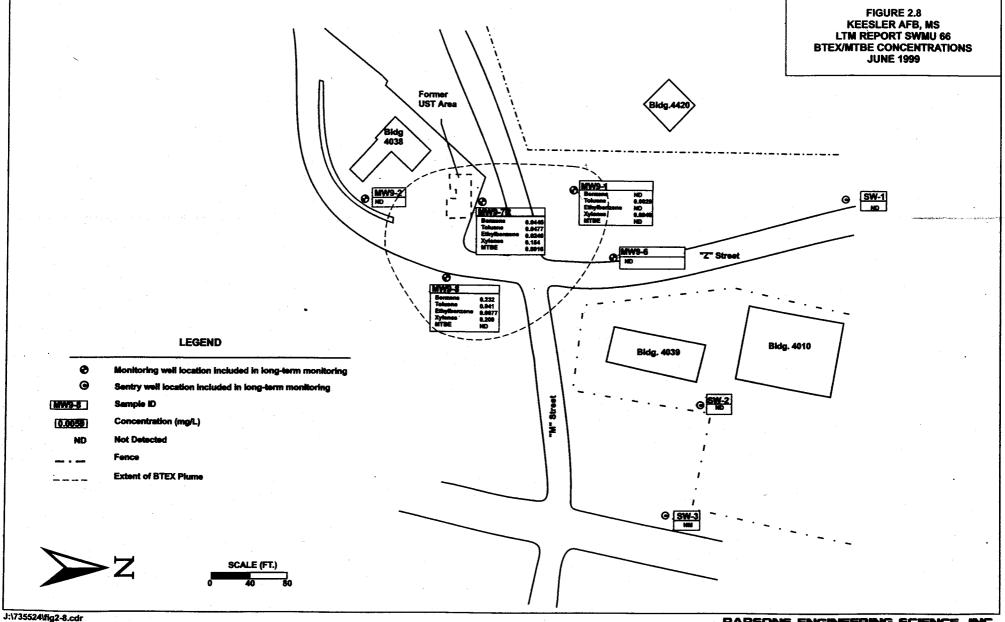


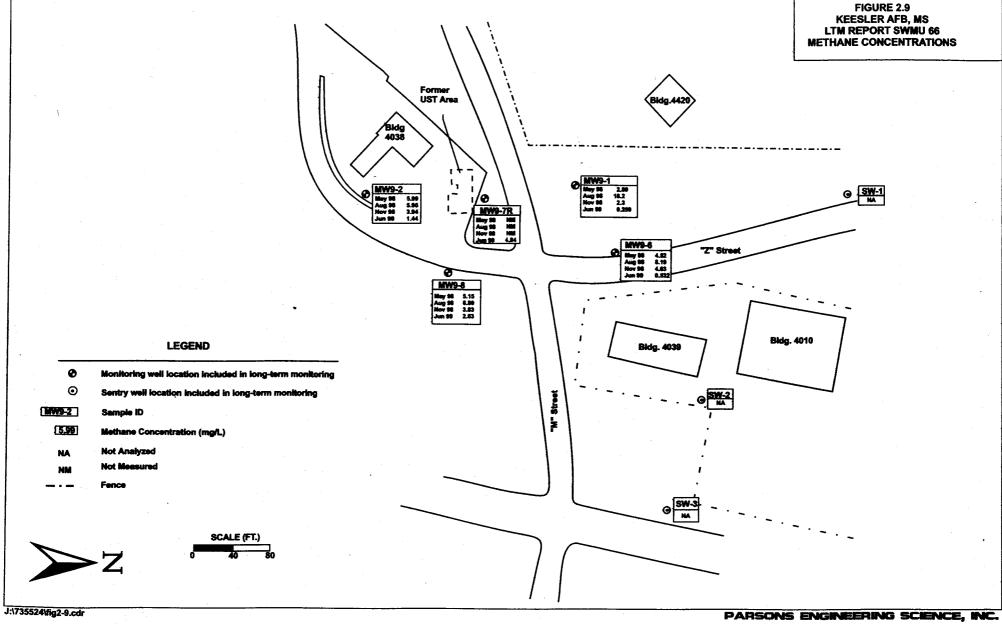
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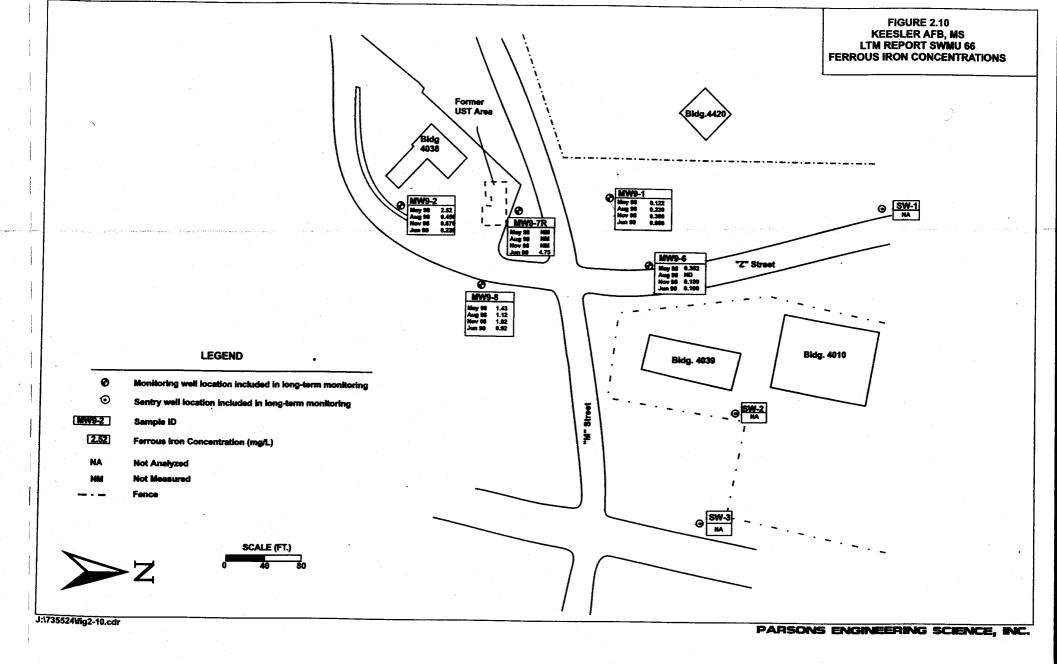




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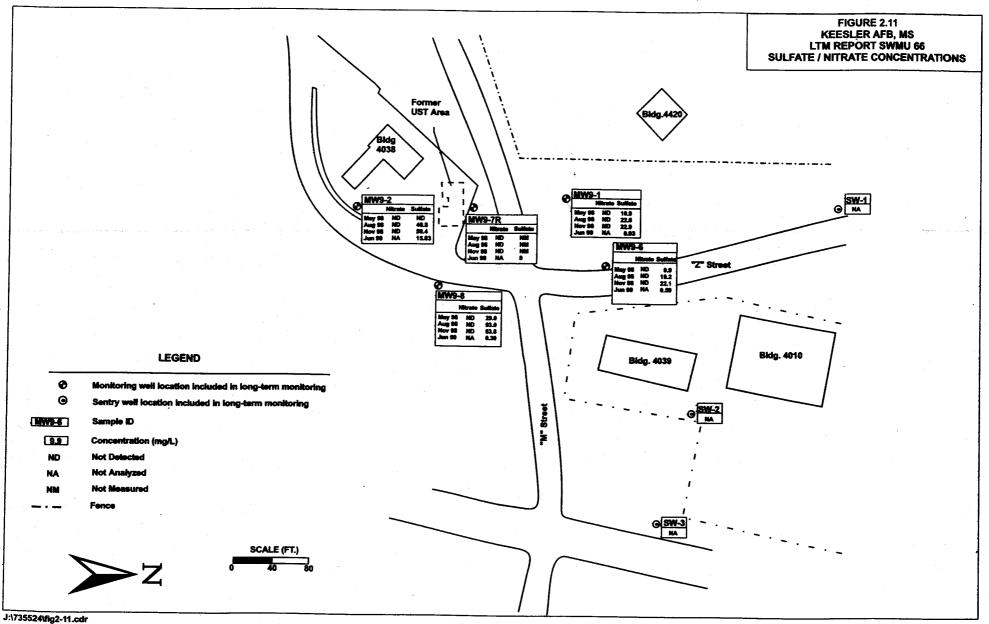


Table 2.1 Well Gauging Summary SWMU 66 June 24, 1999 Keesler AFB, MS

Monitoring	Well TOC	Measurement	Depth to Water	Water Elevation
Well ID	Elevation (ft MSL)	Date	(BTOC)	(ft MSL)
MW9-1	24.20	15-May-98	4.98	19.22
		20-Aug-98	5.30	18.90
		19-Nov-98	4.63	19.57
		24-Jun-99	5.8 —	18.40
MW9-2	24.44	1636 00		
141 44 3-7	24.44	15-May-98	5.13	19.31
		20-Aug-98	5.65	18.79
		19-Nov-98	4.76	19.68
		24-Jun-99	6.04 —	18.40
→ MW9-6	24.14	15-May-98	4.78	19.36
		20-Aug-98	5.11	19.03
		19-Nov-98	4.73	19.41
		24-Jun-99	5.61 —	18.53
MW9-7*	24.32	15 36 00		
1,1,1,2,	24.32	15-May-98	<1.0	<23.32
		20-Aug-98	NM	NM
	~~~~	19-Nov-98	NM	NM
MW9-7R	24.69	24-Jun-99	6.18 —	18.51
MW9-8	24.53	15-May-98	5.33	19.20
		20-Aug-98	4.78	19.75
		19-Nov-98	4.97	
		24-Jun-99	6.23	19.56 18.30
SW-1	22.21	1516		
244-1	22.31	15-May-98	3.45	18.86
		20-Aug-98	3.61	18.70
7		18-Nov-98	3.12	19.19
Č/.x		24-Jun-99	4.04 —	18.27
) SW-2	23.22	15-May-98	4.3	18.92
		20-Aug-98	4.4	18.82
		18-Nov-98	3.84	19.38
		24-Jun-99	5.08 -	18.14
SW-3	21.95	15-May-98	NM	NT C
	··· •	20-Aug-98		NM
		18-Nov-98	3.45	18.5
		24-Jun-99	2.6	19.35
		24-Juil-77	3.91 -	18.04

BTOC - Below Top of Casing

NM - Not Measured

MSL - Mean Sea Level

^{* -} Measurement was not used in Determination of Potentiometric Surface.

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Table 2.2 Groundwater Analytical Summary SWMU 66 Keesler AFB, MS

Monitoring	Sampling	Sampled Compounds in (mg/L)								
Well	Date	Benzene	Toluene	Ethylbenzene		MTBE		Ferrous Iron	Nitrate	Sulfate
MW9-1	14 14 000	NID	MD	NTD.		3.775				
1A1 AA 3-1	14-May-98	ND	ND	ND	ND	ND	2.89	0.122	ND	10.9
	20-Aug-98	ND	ND	ND	ND	ND	18.2	0.230	ND	22.6
	19-Nov-98	ND	ND	ND	ND	ND	2.3	0.360	ND	22.9
	22-Jun-99	ND	0.0029	ND	0.0049	ND	0.259	0.060	NA	0.93
MW9-2	14-May-98	ND	ND	ND	ND	ND	5.99	2.52	ND	ND
	20-Aug-98	ND	ND	ND	ND	0.002	5.95 J	0.450 J	ND	40.8 J
	19-Nov-98	ND	ND	ND	ND	ND	3.94	0.670	ND	50.4
	23-Jun-99	ND	ND	ND	ND	ND	1.44	0.220	NA	15.83
- MW9-6	14-May-98	0.0195	0.0016	0.0054	0.0059	0.0107	4.52	0.302	ND	9.9
	20-Aug-98	0.02	0.002	0.022	0.006	0.009	8.19	ND	ND	19.2
	19-Nov-98	0.01	ND	0.006	0.003	0.003 J	4.03	0.180	ND	22.1
	22-Jun-99	ND	ND	ND	ND	ND	0.532	0.130	NA	0.59
		112	ND	ND	ND	ND	V.552	0.19	INA	0.39
- MW9-7	14-May-98	NM	NM	NM	NM	NM	NM	NM	NM	NM
	20-Aug-98	NM	NM	NM	NM	NM	NM	NM .	NM	NM
	19-Nov-98	NM	NM	NM	NM	NM	NM	NM	NM	NM
MW9-7R	23 <b>-</b> Jun-99	0.0445	0.0477	0.0246	0.154	0.0016	4.84	4.75	NA	0
MW9-8	14-May-98	ND	ND	ND	ND	0.0059	5.15	1.43	ND	29.0
	20-Aug-98	0.004	0.001	ND	0.005	0.008	6.80	1.12	ND	93.0
	19-Nov-98	ND	ND	ND	ND	ND	3.83	1.92	ND	63.8
	23-Jun-99	0.232	0.041	0.0077	0.209	ND	2.63	0.92	NA	0.39
SW-1	14 May 00	NID	NTO.	ND	<b>17</b> 0					
9 AA -1	14-May-98	ND	ND	ND	ND	ND	NA	NA	NA	NA
	20-Aug-98	ND	ND	ND	ND	ND	NA	NA	NA	NA
	18-Nov-98	ND	ND	ND	ND	ND	NA	NA	NA	NA
	22-Jun-99	ND	ND	ND	ND	ND	NA	NA	NA	NA

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Keesler AFB
January 2000

# Table 2.2 Groundwater Analytical Summary SWMU 66 Keesler AFB, MS

Monitoring	Sampling	Sampled Compounds in (mg/L)								
Well	Date	Benzene	Toluene	Ethylbenzene	Xylenes (Total)	MTBE		Ferrous Iron	Nitrate	Sulfate
								-		
SW-2	14-May-98	ND	ND	ND	ND	ND	NA	NA	NA	NA
	20-Aug-98	ND	ND	ND	ND	ND	NA	NA	NA	NA
	18-Nov-98	ND	ND	ND	ND	ND	NA	NA	NA	NA
	22-Jun-99	ND	ND	ND	ND	ND	NA	NA	NA	NA
SW-3	14-May-98	NM	NM	NM	NM	NM	NM	NM	NM	NM
	21-Aug-98	ND	ND	ND	ND	ND	NA	NA	NA	NA
	18-Nov-98	ND	ND	ND	ND	ND	NA	NA	NA	NA.
	22-Jun-99	ND	ND	ND	ND	ND	NA	NA	NA	NA
SW-4*	14-May-98	ND	ND	ND	ND	ND	NA	NA	ŃΑ	NA.
MW-9-10**	20-Aug-98	ND	ND	ND	ND	0.002	0.687 J	0.25 J	ND	18.9 J
MW-9-10***	18-Nov-98	0.01	ND	0.006	0.003	0.002 J	4.03	0.160	ND	22.1

ND - Not Detected

NA - Not Analyzed

NM - Not Measured

^{* -} Duplicate sample of SW-2

^{** -} Duplicate sample of MW9-2; The highest detected value in either sample was reported as MW9-2.

^{*** -} Duplicate sample of MW9-6; The highest detected value in either sample was reported as MW9-6.

mg/L - milligrams per liter

Table 2.3 Initial Groundwater Screening Summary SWMU 66 Keesler AFB, MS

		Purging Data						
Monitoring Well ID	Sampling	Dissolved						
	Date	Temperature (°C)	pН	Conductivity (mS/cm)	Oxygen (mg/L)	Gallons Purged		
MW9-1	14 May 00	22						
141 44 3-1	14-May-98	22	5.92	301	0.28	· 10		
	20-Aug-98	26.7	6.31	361	-0.33	5		
	19-Nov-98	24.5	5.93	309	1.8	5		
	22-Jun-99	24.4	6.19	328	0.03	3		
MW9-2	14-May-98	25.3	£ 01					
2	20-Aug-98	30.3	5.91	352	0.09	6.5		
	19-Nov-98		6.08	462	-0.40	5		
		27.8	5.81	324	1.53	5		
	23-Jun-99	27.9	6.06	546	0.02	3		
MW9-6	14-May-98	22.9	5.86	292	0.06	10		
	20-Aug-98	27.4	6.23	388	-0.48	10		
	19-Nov-98	24.7	5.92	278		. 5		
	22-Jun-99	25.1	5.96		1.62	5		
		23.1	J. <del>9</del> 0	367	0.01	3		
MW9-7	14-May-98	NM	NM	NM	NM	NM		
	20-Aug-98	NM	NM	NM	NM	NM		
	19-Nov-98	NM	NM	NM	· NM	NM		
MW9-7R	23-Jun-99	25.5	6.03	429	0.01	2		
MW9-8	14-May-98	22.9	5.6	336	0.04	8.5		
	20-Aug-98	27	6.13	547	-0.49	5		
	19-Nov-98	26	5.82	381	2.88	5		
	23-Jun-99	25.2	5.26	271	0.01	2		
SW-1	14-May-98	22.1	6.81	237	1.69	9.5		
	20-Aug-98	27.6	6.54	326	0.34	5		
	18-Nov-98	24.8	6.96	151	4.7	5		
	22-Jun-99	25.2	6.41	367	0.47	4		
SW-2	14-May-98	25.3	5.85	202	0.68	9		
	20-Aug-98	32.0	5.50	199	-0.15	5		
	18-Nov-98	27.3	6.00	163	2.15	5		
	22-Jun-99	29.3	5.95	244	0.08	3		
SW-3	14-May-98	NM	NM	NM	NM	NM		
	20-Aug-98	28.1	5.5	387	-0.36	5		
	18-Nov-98	24.7	6.16	335	1.84	5		
	22-Jun-99	26.2	6.1	414	0.01	3		

Values represent last reading taken after equilibrium was reached

NM - Not Measured

# SECTION 3 SAMPLE COLLECTION PROCEDURES AND QUALITY ASSURANCE / QUALITY CONTROL

### 3.1 SAMPLE COLLECTION

Groundwater sampling was conducted at SWMU 66 on May 14, 1998, August 20, 1998, November 18-19, 1998, and June 22-23, 1999. To the extent possible, the well locations were sampled in order of increasing groundwater contaminant concentrations to minimize cross contamination potential. All sample collection activities and field observations were recorded in the field logbook. General procedures for the handling and collection of groundwater samples during this round of sampling are described in the following sections.

# 3.1.1 Groundwater Sampling and Handling

Prior to purging, the static water levels and depth to bottom of the wells were measured to the nearest 0.01 foot from the top of the well casing (TOC) using a clean water level indicator. Prior to the collection of groundwater samples at each location, each well was purged using a peristaltic pump. Field parameters including pH, conductivity, dissolved oxygen and temperature were measured during the purging process to ensure that representative aquifer water was being sampled. Purging activities continued until these parameters had stabilized (less than ± 0.2 standard pH units or a 10-percent change for the other parameters), or until a minimum of three well casing volumes of groundwater had been removed. The meter used (Horiba U-10) to measure the field parameters was calibrated each day prior to use. Table 2.3 summarizes the final field parameters collected during the purging process. The purge water was containerized and taken to an onsite oil/water separator for disposal.

Groundwater samples were collected following stabilization of field parameters using a peristaltic pump with new polyethylene tubing. Groundwater samples were placed in appropriate pre-labeled containers and securely sealed. The bottle labels indicated the sample number and source, sampler's initials and date of sample collection. Sample collection times and all other pertinent information was entered on groundwater sampling forms (Appendix B) or in the bound field logbook. Chain of custody forms accompanied the samples throughout all phases of sample shipment and handling. The samples were placed on ice in a cooler to maintain a temperature of 4 degrees centigrade, and then shipped to Specialized Assays Laboratory in Nashville, TN, for analysis. The groundwater samples and quality control (QC) samples were analyzed as specified in Section 2.2.

Laboratory blanks accompanied each set of sample analyses. The results of these blank analyses and other QC sample results are discussed below.

## 3.2 QUALITY ASSURANCE/QUALITY CONTROL

Quality Assurance/Quality Control (QA/QC) includes the assessment of precision, accuracy, representativeness, comparability and completeness. QA/QC is evaluated by the review of the field and laboratory methodologies, the collection and analysis of field QC samples (trip blanks and coded field duplicates), as well as the internal laboratory QC analyses (surrogate spikes, method blanks, laboratory control sample/laboratory control sample duplicates). The following discusses the results of the QA/QC review.

#### 3.2.1 Precision

The precision was measured by the relative percent difference (RPD) of results from the coded field duplicate samples and matrix spike/matrix spike duplicate (MS/MSD) analyses. One groundwater coded field duplicate and one MS/MSD sample analyses were conducted during each sampling event.

The coded field duplicate analyses exhibited similar results for all BTEX constituents within 0.001 mg/L. This is within field duplicate RPD limits. The QC limit for coded field duplicate RPD is less than or equal to 20 % unless one or both results are less than the reporting limit. If one or more results are less than the reporting limit, the absolute difference between the two results must be less than two times the reporting limit. The laboratory has established QC criteria for the MS/MSD RPD. All MS/MSD met the laboratory RPD limits with the exception of sulfate in the MS/MSD for the fourth quarter sampling event. The RPD (13.7%) exceeded the lab criteria of 10% maximum RPD. However, it was below the data validation criteria of 20%. No action was required.

# 3.2.2 Accuracy

The accuracy was measured by the percent recovery (%R) of the surrogate, MS/MSD and LCS spikes. The %Rs for all surrogate analyses met the 70 to 130 % QC limit. All target compounds (benzene, toluene, ethylbenzene, xylenes, methyl-t-butylether, methane, ferrous iron, nitrate, and sulfate) were spiked into the MS/MSD and LCS samples. All %Rs for the representative spike compounds met the 70 to 130 % QC limit.

## 3.2.3 Representativeness

Representativeness expresses the degree to which sample data accurately and precisely represents actual site conditions. The assessment of representativeness is evaluated qualitatively by reviewing the sampling and analysis methodologies and

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quantitatively by the assessment of the field and laboratory blanks and field duplicates results.

The field sampling team and the laboratory used standard methodologies. Laboratory method blanks were associated with all analytical batches containing environmental samples. The sample results from the four sampling events are qualitatively representative of the compounds contained in the sample media.

## 3.2.4 Comparability

Comparability expresses the confidence with which one set of data can be compared with another. Comparability can be related to precision and accuracy as these quantities are measures of data reliability. All measurement data generated were expressed in standard units as defined by the method to allow comparability of data among different sets/sampling efforts. The laboratory results from the four sampling events were comparable.

### 3.2.5 Completeness

The completeness of the project is measured by the percentage of useable results. The project sample results are 100% complete and all sample results are useable as qualified.

# SECTION 4 POTENTIAL RECEPTORS AND MIGRATION PATHWAYS

### 4.1 POTENTIAL EXPOSURE PATHWAYS

The potential routes of migration for the petroleum hydrocarbons at SWMU 66 are leaching from soil to groundwater, volatilization from soils and groundwater with subsequent vapor-phase movement, and transport with groundwater flow. Human exposure pathways can exist for inhalation, ingestion and dermal contact of site contaminants in various site media that include groundwater, subsurface soils, soil vapor and surface soils. This section discusses the fate, transport, and potential exposure pathways of the contaminants of concern at SWMU 66.

In order to determine which populations may be exposed to hydrocarbons at SWMU 66, it is necessary to evaluate current and future use of the property. By identifying current and future land use, potentially exposed populations can be identified and the exposure pathways can be evaluated. Currently, Keesler AFB is used as an Air Education and Training Command Base. In the future, Keesler AFB will likely continue to be used for similar or other military purposes.

# 4.1.1 Surface Water Receptor Pathways

Discharge to local surface water does not appear to be a current risk factor associated with hydrocarbons in groundwater beneath SWMU 66. The closest potential aquifer discharge point is the Mississippi Sound located approximately 1845 feet south of the site.

# 4.1.2 Soil Hydrocarbon Receptor Pathways

Residual hydrocarbons exist in shallow soils at SWMU 66. Inhalation, ingestion, and dermal exposure to soils impacted by hydrocarbons are possible exposure pathways associated with this site. These soils are sufficiently deep to minimize the potential for incidental contact or soil migration away from the site. The potential exposure risk for soils increases during excavation or other intrusive activities.

The entire base is fenced with guarded gates to prevent unauthorized access to this site. The most likely receptors for exposure to the contaminants are future site workers involved with excavation activities. However, by advising site workers of hazard potentials and wearing appropriate protective safety equipment, exposure potential can be minimized or eliminated. Given the current industrial use of the site and anticipated future use as an industrial area, it is highly unlikely that reidential development will ever occur. Land use controls are proposed for this site which will prevent residential use from occurring. The risk potential for hydrocarbon inhalation is insignificant at the site in its current undisturbed condition. However, the risk for inhalation of hydrocarbons would increase during activities that disturb and expose subsurface soils. Through the use of appropriate safety equipment, complete pathways for exposure to the contaminants are eliminated or reduced to acceptable levels for industrial workers during intrusive activities.

### 4.1.3 Groundwater Receptor Pathways

Groundwater is the primary mechanism for potential off-site hydrocarbon migration. However, human ingestion of hydrocarbons via groundwater consumption is a very low risk associated with this site. No water supply wells exist in the surficial aquifer on Keesler AFB. Therefore, a complete exposure pathway does not exist. Groundwater for consumptive purposes is obtained from the Graham Ferry Formation which is part of the Miocene aquifer system. The surficial aquifer system is separated from the Graham Ferry Formation by less permeable stratigraphic units contained in the upper part of the formation. Therefore a pathway of exposure by consumption or dermal contact is not present.

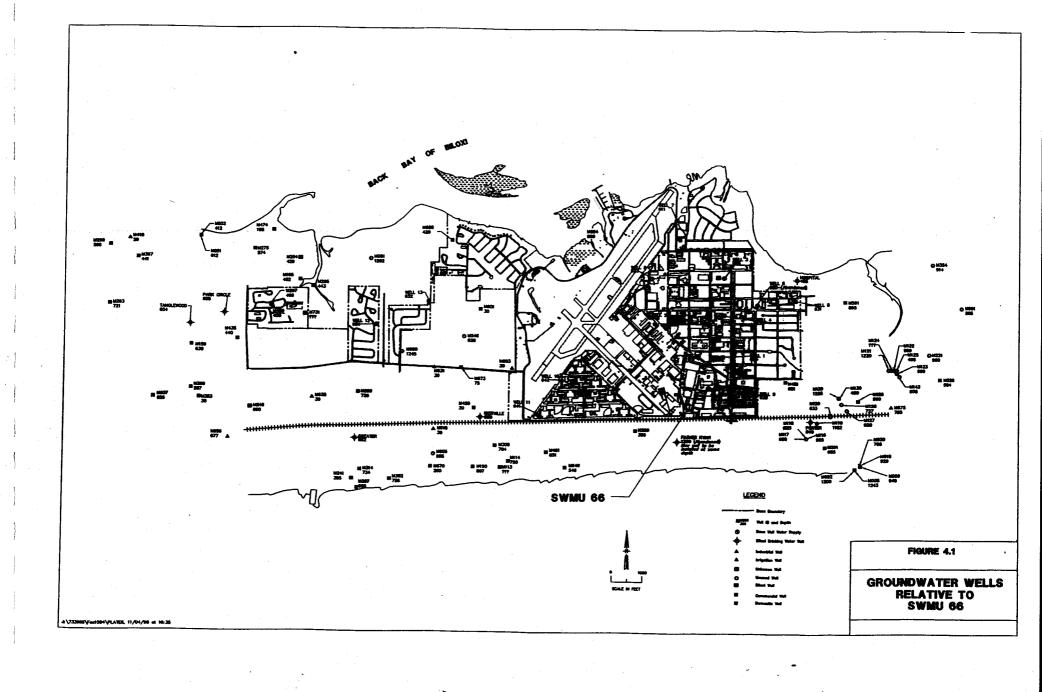
Even though a complete exposure pathway does not exist at SWMU 66, MDEQ regulates the surficial aquifer as a drinking water source. The proposed corrective action at SWMU 66 includes land use controls which would prevent future development of the site and would also prevent the usage of site groundwater by potential human receptors.

### 4.2 WATER-SUPPLY WELL SURVEY

Keesler AFB obtains water from a system of 11 potable supply wells all of which pump from the 600-ft sands. These wells range in depth from 611 to 684 feet. Two of the wells are located west of the main base, near the V.A. Hospital. The remaining wells are located south and east of the runway. Newcome (1968) reported a daily pumping rate at Keesler AFB of 3.6 million gallons per day (gpd). Aquifer tests were performed on six of the Keesler AFB wells in 1964. In short, the aquifer thickness of the 600-ft sands

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ranged from 60 to 100 ft with an average thickness of 84 ft. Transmissivity in these six wells ranged from 60,000 to 100,000 gpd/ft and hydraulic conductivity ranged from 670 to 1000 gpd/ft². Storage coefficients were reported for base wells number 1 and 5 as 0.0003 and 0.0004 (Colson and Boswell 1985). A summary of water-supply wells at Keesler AFB is given in Table 4.1. Figure 4.1 illustrates the relative locations of these wells to SWUM 66. The nearest well to SWMU 66 is Well 9 located approximately 1200 feet to the northeast.



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Table 4.1

Keesler AFB Water Supply Wells

				Static Water Level (ft below land		Screen			e de la companya de l	Hydraulic	
Well Number	Building	USGS Number	Well Depth (ft)	surface datum)	Measurement Date	Diameter (inches)	Screen Length (ft)	Primary Aquifer (USGS Classification)	Transmissivity GPD/ft	Conductivity	Storage
1	3509	M64	624	71.0	1986	10	40	Graham Ferry, fm	100,000	1,000	Coefficient
2	1921	M67	640	76.0	1986	10	40	Graham Ferry, fm	100,000	1,000	0.0003
3	0621	M66	646	76.0	1986	10	40	Graham Ferry, fm	<del></del>	-	
4	2121	M65	636	73.0	1986	10	40	Graham Ferry, fm	_		_
5	0916	M68	623	70.0	1986	10	40	Graham Ferry, fm	60,000	1,000	0.0004
6(a)	5705	M63	650	2.0	1942	10	50	Graham Ferry, fm	-	1,000	0.0004
7	0242	M75	611	75.0	1986	12	40	Graham Ferry, fm	62,000	960	_
8	6005	M76	631	74.0	1986	12	40	Graham Ferry, fm	67,000	670	
19	3967	M77	639	83.0	1986	12	40	Graham Ferry, fm			
10	7301	M78	642	74.0	1986	12	40	Graham Ferry, fm	73,000	730	
11	7501	M79	641	81.0	1986	12	40	Graham Ferry, fm	80,000	1,000	
12	9161	M82	684	48.0	1978	10	60	Graham Ferry, fm	· .		
13	7721	M650	652	50	1986	10	85	Graham Ferry, fm			
(b)	6634	M681	60	0.5(c)	1984	4		_			

⁽a) Abandoned

Sources: USGS file data

Brown et al., 1944; Newcome, 1968; USGS file data, 1993; Colson-Boswell, 1985

ES, 1984; ESE, 1991

⁽b) This well is used to maintain the water level in the golf course pond; it is not used as a drinking water source.

⁽c) Water level is 0.5 ft above local land surface datum.

# SECTION 5 CONTAMINANT ATTENUATION ASSESSMENT

#### 5.1 INTRODUCTION

Biodegradation of dissolved fuel constituents is assessed in this section and Appendix C to support selection of an appropriate remedial alternative for SWMU 66. As used throughout this report, the term "remediation by natural attenuation" (RNA) refers to a subsurface contaminant management strategy that relies on natural physical, chemical, and biological mechanisms to control exposure of potential receptors to concentrations of contaminants in soil and groundwater that exceed regulatory levels. These mechanisms include the processes of hydrodynamic dispersion, dilution, sorption, volatilization, and biodegradation, which facilitate RNA of a variety of anthropogenic chemicals.

This section summarizes the contaminant attenuation assessment for SWMU 66. The full assessment for this site is presented in Appendix C.

# 5.2 EVIDENCE OF CONTAMINANT BIODEGRADATION OVER TIME

The first step in determining whether fuel hydrocarbon constituents are biodegrading in groundwater at SWMU 66 was to compare contaminant concentrations at selected sampling locations over time. The purpose of this comparison was to assess the evidence of field-scale contaminant mass loss. Decreases in the magnitude of contaminant concentrations at a site over time that cannot be explained by physical processes (e.g., source removal, mass transport in groundwater) may be the first indication that contaminants are biodegrading at the site.

# 5.2.1 Hydrocarbon Concentration Trends in Groundwater

Hydrocarbon concentrations were measured at SWMU 66 from six monitoring wells in May 1998, August 1998, and November 1998, and from eight monitoring wells in June 1999. The data from these sampling events are summarized in Table C.1. Three of the eight monitoring wells had measurable concentrations of total BTEX; the BTEX concentrations increased in all three wells since the May 1998 sampling event and can be attributed to the mass transport of the plume in the groundwater. Monitoring well MW9-6 was the only well to have total BTEX concentrations decrease (207.9 µg/L to non detect) since the 1998 sampling event.

Decreasing dissolved hydrocarbon concentrations indicate that the mass of hydrocarbons input into the groundwater system in the source area (through leaching of residual hydrocarbons in soils) is decreasing, and that biodegradation of dissolved BTEX is occurring.

# 5.3 EVIDENCE OF CONTAMINANT BIODEGRADATION VIA MICROBIALLY MEDIATED REDOX REACTIONS

Groundwater geochemical data can be used to show that fuel hydrocarbons are biodegrading in saturated soil and groundwater at SWMU 66. Fuel hydrocarbon constituents are typically utilized as electron donors in biologically mediated redox reactions under a wide range of geochemical conditions. Therefore, analytical data on potential electron acceptors can be used as geochemical indicators of fuel hydrocarbon biodegradation (Wiedemeier et al., 1995). Reductions in the concentrations of oxidized chemical species that are used by microorganisms to facilitate the oxidation of fuel hydrocarbon compounds within contaminated media are an indication that contaminants are biodegrading. Alternately, an increase in the metabolic byproducts resulting from the reduction of electron acceptors can be used as an indicator of contaminant biodegradation. The availability of potential electron acceptors to participate in contaminant biodegradation reactions can be used to estimate the total contaminant mass that can be biodegraded over time at this site. Coupled with calculated biodegradation rates, this information can be used to predict how much and how quickly fuel hydrocarbons can be removed from saturated soils and groundwater at SWMU 66 as a result of natural processes only.

Throughout the following subsections, the distributions of geochemical parameters are examined by comparing background concentrations to fuel hydrocarbon plume core concentrations. Analytical data from upgradient well MW9-2 is used for background concentrations. Analytical data from MW9-7R, and MW9-8 are used for fuel hydrocarbon plume core concentrations. Hydrocarbon concentrations are presented on Figure 2.8. The following shows qualitatively the expected geochemical parameter response to biodegradation of BTEX compounds, with \(^{\tau}\) referring to relatively high concentrations and \(^{\tau}\) referring to relatively low concentrations (Payne, et al. 1995):

BTEX 
$$\uparrow$$
:  $O_2 \downarrow NO^{3-} \downarrow NH_3 \uparrow Fe^{2+} \uparrow SO^4 \downarrow H_2S \uparrow CH_4 \uparrow$   
BTEX  $\downarrow$ :  $O_2 \uparrow NO^{3-} \uparrow NH_3 \downarrow Fe^{2+} \downarrow SO^4 \uparrow H_2S \downarrow CH_4 \downarrow$ 

# 5.3.1 Dissolved Oxygen (O₂)

The overall low magnitude of DO concentrations indicates that oxygen is not currently a significant electron acceptor during microbially mediated degradation of fuel hydrocarbons at SWMU 66.

#### 5.3.2 Ammonia (NH₃)

Ammonia concentrations detected in shallow groundwater varied acros with elevated ammonia concentrations occurring in the fuel hydrocarbon plume core area. Therefore, production of ammonia appears to be occurring due to increased microbial activity stimulated by the relative abundance of organic carbon (fuel hydrocarbons).

# 5.3.3 Ferrous Iron (Fe²⁺)

The occurrence of elevated ferrous iron concentrations within contaminated areas indicates that ferric iron is acting as an electron acceptor at these locations.

# 5.3.4 Sulfate (SO⁴)

In general, there is good correlation between areas of depleted sulfate concentrations and the plume core. The decrease of sulfate within the contaminated area indicates microbial populations are using sulfate to oxidize fuel hydrocarbons at the site.

# 5.3.5 Dissolved Methane (CH₄)

The presence of elevated methane levels in groundwater at SWMU 66 strongly indicates biodegradation is occurring via methanogenesis.

# 5.4 THEORETICAL ASSIMILATIVE CAPACITY ESTIMATES

On the basis of theoretical assimilative capacity calculations performed in Appendix C, one pore volume of saturated soil and groundwater at SWMU 66 has the capacity to oxidize an average BTEX concentration of approximately 11.96 mg/L (11,960  $\mu$ g/L) (Table C.4). The maximum BTEX concentration at SWMU 66 in June 1999 was 0.49 mg/L (489.7  $\mu$ g/L).

This estimate essentially represents an estimate of the fuel hydrocarbon reduction capability of one pore volume of groundwater at SWMU 66. The estimate identifies how much contaminant mass can be theoretically oxidized as one pore volume travels through the plume core. In reality, one pore volume is expected to move through the contaminated aquifer material in the source area every 7.1 years based on the estimated groundwater velocity of 45 ft/yr and a source area length of approximately 320 feet.

#### 5.5 SUMMARY OF FINDINGS

The results of the chemical fate assessment performed in this section are as follows:

1. Historical groundwater analytical data indicate BTEX concentrations in most wells since May 1998 are increasing over time;

- 2. Geochemical data strongly indicate that biodegradation of fuel hydrocarbons is occurring primarily through the processes of iron reduction, sulfate reduction, nitrogen fixation and methanogenesis; and
- 3. The expressed BTEX assimilative capacity of the aquifer (11.96 mg/L) is more than the maximum BTEX concentration detected in SWMU 66 groundwater (0.49 mg/L).

These results are discussed further in Section 6 and Appendix C.

# SECTION 6 CONCLUSIONS AND RECOMMENDATIONS

#### 6.1 CONCLUSIONS

BTEX constituents have been detected in all wells at SWMU 66 during the last four sampling events with the exception of MW9-2. The detections of toluene in sentry wells SW-1, SW-2 and SW-3 during the November 1998 sampling event may be attributed to trip blank contamination as the BTEX plume has apparently not migrated this far. During the June 1999 sampling event, BTEX compounds were detected in groundwater samples from monitoring wells MW9-1, MW9-7R, and MW9-8. MTBE was detected in only one well; MW9-7R. The contaminant plume is relatively stable based upon the four sampling events. MTBE concentrations have decreased over time to the point where this compound is now found only in the source area well (MW9-7R).

Geochemical data strongly indicate that biodegradation of fuel hydrocarbons is occurring primarily through the processes of iron reduction, sulfate reduction, nitrogen fixation and methanogenesis. The expressed BTEX assimilative capacity of the aquifer (11.96 mg/L) is more than the maximum BTEX concentration detected in SWMU 66 groundwater (0.49 mg/L).

The groundwater flow direction has remained basically the same (north) for the four periods, with some minor shifting between northeast to northwest.

#### 6.2 RECOMMENDATIONS

Long term monitoring of groundwater is currently recommended for SWMU 66. Annual groundwater sampling will be performed for two more years. Monitoring wells included in the sampling program are MW9-1, MW9-2, MW9-6, MW9-7R, MW9-8, SW-1, SW-2, and SW-3. Groundwater samples from these wells will be analyzed for BTEX by EPA Method 8021B. Natural attenuation parameters will also be measured in these wells. If, after this two year period, COCs remain above ARARs, groundwater monitoring will continue. If COCs fall below ARARs at the end of the monitoring period, then monitoring will cease.

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# SECTION 7 REFERENCES

- Colson, B.E. and E.H. Boswell, 1985. Water-Resources Overview of the Mississippi Gulf.
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- Parsons Engineering Science, Inc, 1999. Keesler Air Force Base U.S. Installation Restoration Program Final RCRA Facility Investigation Report. Prepared for U.S. Air Force . EPA I.D. No. MS2 570 024 164. Atlanta, Georgia.

APPENDIX A LABORATORY DATA

1000

APPENDIX A.1 LABORATORY DATA MAY 1998

2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

GER BALDWIN
390 TRIANGLE PARKWAY STE 100

DRORDSS, GA 30092

Poject: 733430 - Name: K

roject Name: KEESLER (LTM) SWMU 66

mampler: B. L.

Lab Number: 98-A55154

Sample ID: SW-1

Sample Type: Water

Site ID:

Date Collected:

5/15/98

Time Collected: 10:20

Date Received:

5/16/98

Time Received:

9:00

	Analyte	Kesult	Units	Report Limit	Quan Limit	9il Factor	Date	Tine	Analyst	Method	Satch
i je	*IIRGANIC PARAMETERS*										
	Beazene	ЖD	ng/l	0.0010	0.0010	1	5/21/98	14:60	Duncan, J.	80219	1732
	Toluena	HD	ng/I	0.6010	0.0010	1	5/21/98	14:00	Duncan, J.	80218	1792
	Ethylbenzene	ND	ng/1	0.0010	0.9010	1	5/21/98	14:60	Duncan, J.	80218	1732
	Xylenes, total	HD OH	Hg/I	9,0010	0.0010	1	5/21/98	14:00	ນັບຄວາກ, ປີ.	80218	1732
	Hethyl-t-butylether	HD	mg/1	0.0010	0.0010	1	5/21/98	14:00	Duncan, J.	80218	1732

ND = Not detected at the report limit.

Surrogate

**X** Recovery

Target Range

BISX/GRO Surr., a,a,a-trifluorotoluena

94.

50. - 150.

Report Approved By:

Report Date: 6/ 9/98

Theodore & Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

### ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

DOER BALDWIN

390 TRIANGLE PARKWAY STE 100

DECROSS, GA 30092

roject: 733430

roject Name: KEESLER (LTM) SWMU 66

ampler: B. L.

Lab Number: 98-A55152

Sample ID: SW-2

Sample Type: Water

Site ID:

Date Collected: 5/15/98

Time Collected:

7:45

Date Received:

5/16/98

Time Received:

9:00

Analyte		Result	Units	Report Limit	Nuan Limit	Dil Factor	Date	Tine	Analyst	Metrod	Natch
*OKSANIC PARAMETERS*											
Benzene		ND CK	ng/1	0.0010	0.0010	1	5/21/98	13:89	Duncan, J.	8021B	1732
Isluene	4.	ДЖ	ng/l	0.0010	0.0010	1	5/21/98	13:09	Duncan, J.	8021B	1732
Ethylbenzene		ND	нд/1	0.0010	0.0010	1	5/21/98	13:09	Duncan, J.	8021R	1732
Xulenes, total		MD.	Hg/1	0.0010	0.0010	1	5/21/98	13:09	Duncan, J.	80218	1732
Hethyl-t-butylether		ND	ng/l	0. G010	0.0010	1	5/21/98	13:09	Duncan, J.	80218	1752

ND = Not detected at the report limit.

Surrogate % Recovery Target Range

BTEX/GRD Surr., 3,3,3-trifluorotoluene

95.

50. - 150.

Report Approved By: The down

Report Date: 6/ 9/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director

# 2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### SPECIALIZED ASSAYS, INC.

ANALYTICAL

PARSONS ENG. /KEESLER AFB, MS 8249

DGER BALDWIN 390 TRIANGLE PARKWAY STE 100 URCROSS, GA 30092

Poject: 733430

Project Name: KEESLER (LTM) SWMU 66

pmpler: B. L.

Lab Number: 98-A55153

Sample ID: SW-4

Sample Type: Water

Site ID:

Date Collected: 5/15/98

Time Collected:

8:40

Date Received:

5/16/98

Time Received:

9:00

Analyte	Result	Units	Report Limit	Quan Limit	Bil Factor	Date	Tire	Analyst	Method	Batch
*ERGANIC PARAMETERS* Benzene loluene Ethylbenzene Xylenes, total Methyl-t-butylether	KD KD	ng/1 ng/1 ng/1 ng/1 ng/1	6.0010 6.0010 6.0010 6.0010 8.0010	0.0010 0.0010 0.0010 5.0010 0.0010	1 1 1		13: 35 13: 35 13: 35	Duncan, J. Duncan, J. Duncan, J.	80218 80218 80218 80216 80219	1732 1732 1732 1732 1732

ND = Not detected at the report limit.

Surrogate 2 Recovers Target Range

BTEX/SEM Surr., a,a,a-trifluorotolueme

93.

50. - 150.

Report Approved By: Theylor O

Report Date: 6/ 9/98

Theodore J./Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

## ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

OGER BALDWIN

390 TRIANGLE PARKWAY STE 100

ICRORDSS, GA 30092

roject: 733430

'roject Name: KEESLER (LTM)

lampler: R. B.

Lab Number: 98-A54140

Sample ID: MW9-1

Sample Type: Water

Site ID:

5/14/98 Date Collected:

Time Collected: 14:43

Date Received:

5/15/98

Time Received:

9:00

Analyte	Result	Units	Report Limit	Ruan - Linit	Dil Factor	Date	Tine	Analyst	Method	Satch
*DRGANIC PARAMETERS*							v.			
Benzese	ND	ng/l	0.0010	0.0010	1	5/21/98	14: 52	J.Mitchell	80218	936
Toluese	NO	ng/l	0.0010	0.0010	1	5/21/98	14:52	J. Mitchell	30210	936
Ethylbanzene	ND	ng/1	0.0010	0.0010	i	5/21/98	14:52	J.Mitchell	30218	936
Xulenes, total	DK	ng/1.	0.0010	0.0010	1	5/21/98	14:52	J.Mitchell	80218	936
Msthyl-t-butylether	KD	ng/l	0.0010	0.0010	1	5/21/98	14: 52	J.Mitchell	80218	936
*MISCELLANEDUS SC PARAM	TERS×						3			
Methane	2.89	ng/L	0.260	0.026	10	5/19/98	11:40	H. Klepper	8015H	942
*METALS*										
Ferrous Iron	0.122	ng/1	0.100	0.160	1	5/19/98	12: 28	A Hardison	350CD	944
*MISCELLANEOUS CHEMISTR	Y <b>X</b>									
pH	6.00	pH Units			1	5/15/98	10:32	F. Frye	9040/150.1	
Kitrate-H as H	HD	ng/l	0.10	0.10	1	5/15/98	23: 21	J. Tenple	<b>35</b> 3.2	636
Sulfate	10.9	ng/l	5.00	5.00	1	5/22/98	15:17.	6. Baun	8689	3232

ND = Not detected at the report limit.

Target Range % Recovery Surrogate

OTEX/GRO Surr., a,a,a-trifluoratoluene

95.

50. - 150.

Report Approved By: Theodore

Report Date: 6/ 9/93

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director -



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### ANALYTICAL REPORT

PARSONS ENG. /KEESLER AF8, MS 8249

OGER BALDWIN

DGER BALDWIN
390 TRIANGLE PARKWAY STE 100

TORCROSS, GA 30092

roject: 733430

Project Name: KEESLER (LTM)

ampler: R. B.

Lab Number: 99-A54137

Sample ID: MW9-2 Sample Type: Water

Site ID:

Date Collected:

5/14/98

Time Collected: 12:30

Date Received:

5/15/98

Time Received: 9:00

inalyte	Result	Units	Report Linit	Quan Linit	Dil Factor	Gate	Tine	Analyst	Method	Batci
GIRGANIC PARAMETERS»										
denzene	HD	ng/i	0.0010	0.0010	1	5/21/98	14:26	J.Mitchell	80218	.936
loluene	KD	ng/l	0.0010	9.0010	1	5/21/98	14: 26	J. Mitchell	80216	936
thylbenzene	Ю	ng/1	0.0010	0.0010	1	5/21/98	14:26	J. Mitchell	80212	936
(glenes, total	NO	ng/1	0.0019	0.0010	1	5/21/98	14:26	J.Mitchell	<b>8021</b> 0	936
lethyl-t-butylether	ND	ny/l	9,0010	0.0010	1	5/21/98	14:26	J.Mitcheli	80213	936
MISCELLANEDUS GC PARAME Nethane	Ters× 5.99	ng/L	0. 268	0. 02ა	.10	5/19/98	10: 34	H. Klepper	8015M	942
RETALS* Ferrous Iroa	2, 52	ng/l	0.100	0.100	1	5/19/98	12:28	A Hardison	35000	944
HISCELLANEBUS CHEMISTRY	ř¥.									
pH	6.10	pH Units			1	5/15/98	10:30	F. Frye	9940/150.1	937
itrate-N as H	ДX	mg/l	0.10	3, 10	i	5/15/98	23: 18	J. Temple	353.2	939
	ND	Hg/1	5.00	5.00	1	5/22/98	15: 11	S. Baun	9038	3232

= Not detected at the report limit.

Serrogate % Recovery

STEM/GRO Surr., a,a,a-trifluorotoluene

94.

Throllow 10 mills

50. - 150.

Target Range

Report Approved By:

Report Date: 6/ 9/98

Theodore J. Guello, Ph.D., Q.A. Officer

Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director

2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249 OGER BALDWIN

390 TRIANGLE PARKWAY STE 100

ORCRUSS, GA 30092

roject: 733430

roject Name: KEESLER (LTM)

ampler: R. B.

Lab Number: 98-A54138

Sample ID: MW9-6 Sample Type: Water

Site ID:

Date Collected:

5/14/98

Time Collected: 13:20

Date Received:

5/15/98

Time Recaived:

9:00

Analyte	Result	Units	Report Linit	Ruan Linit	Dil Factor	Date	Tine	Analyst	Hethod	Rates
*BRSANIC PARAMETERS*					***************************************					
Senzene	6.0195	ng/l	0.0010	0.0010	1	5/21/98	15: 43	J.Mitchell	8021B	936
Toluene	0.0016	ng/1	0.0010	0.0010	+	5/21/98	15: 43	J. Mitchell	80215	936
Ethylbenzene	0.0054	ng/1	0.0010	0.0010	1	5/21/98	15: 43	J. Mitchell	8021B	936
Xglenes, total	0.0059	ng/1	0.0010	0.0010	1	5/21/98	15: 43	J.Mitchell	8021B	936
Methyl-t-butylether	0.0107	ng/l	0.9010	0.0010	1	5/21/98	15: 43	J. Mitchell	8021B	936
*MISCELLANEOUS GC PARAM	ETERS*									
Hethane	4.52	ng/L	0.260	0.026	10	5/19/98	11:03	W. Klepper	8015H	942
XMETALSX										
Ferrous Iron	0.302	ng/1	0.100	9, 180	1	5/19/98	12: 28	A liardison	35000	944
*MISCELLANEGUS CHEMISTR	(x									
pH	6.10	pH Units			1	5/15/98	18:30	f. Frye	9040/150.1	937
Nitrate-N as H	NO	mg/1	0.10	9.10	1	5/15/98	23:20	J. Templa	353.2	939
Sulfate	9.90	ng/l	5.00	5.00	1	5/22/98	15:11	G. Baun	9038	3232

ND = Not detected at the report limit.

Surrogate X Recovery Target Range

BTEX/GRU Surr., a,a,a-trifluorotoluene

90.

50. - 150.

Report Approved By:

Report Date:

Theodore J. Duella, Ph.D., Q.A. Officer Michael H. Dung, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



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#### ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249

DGER BALDWIN B90 TRIANGLE PARKWAY STE 100 DECROSS, GA 30092

Project: 733430

Froject Name: KEESLER (LTM)

pampler: R. B.

Lab Number: 98-A54139

Sample ID: MW9-8

Sample Type: Water

Site ID:

Date Collected: 5/14/98

Time Collected: 14:15

Date Received:

5/15/98

Time Received: 9:00

	Analyte	Result	Vaits	Report Limit	Quan Linit	Dil Factor	Date	Time	Analyst	Method	Batch
		नेवर्ष देशि पत्रने पश्चित वाले पृथ्यन वर व व्यव प्रयान पर	- and - and any any and - and - and	***************************************	700 W. of all all all	***************************************				. *************************************	
	*URGANIC PARAMETERS*	4400									
徽	Denzene	MD.	ng/l	0.0010	0.0010	1	5/21/98	15:17	J.Mitchell	80219	936
	Toluene	KD	ng/I	0.0010	0.0010	1	5/21/98	15:17	J.Mitchell	80218	936
	Ethylbenzene	RD	ng/l	0.0010	0.0010	1	5/21/98	15:17	J.Nitchell	3021B	936
	Xglenes, total	ЖC	mg/1	0.0018	6.0010	1	5/21/98	15:17	J.Mitchell	8021B	936
	Nothyl-t-butylether	0.0059	ng/1	0.0010	0.0010	1	5/21/98	15:17	J.Mitchell	80219	936
	*HISCELLANEBUS SC PARAMETE	P¢s									
	dethane	5.15	ng/L	0.260	0.026	10	5/19/98	11: 35	W. Klepper	8015#	942
7	XMETALS*										
	Ferrous Iron	1.43	ng/l	8.100	0.100	i	5/19/98	12:28	A Hardison	35000	944
	xHISCELLANEOUS CHEMISTRYX										
	pH	5.70	pH Units			1 .	5/15/98	10: 32	F. Frye	9040/150.1	937
110	Mitrate-N as N	RD	ng/l	0.10	8.10	1			-		939
	Sulfate					-					3232
	<pre>nitrate-n as n Sulfate NO = Not detected at the r</pre>	29.0	ng/1 ng/1	9, 10 5, 00	8.10 5.00	1. 1	5/15/98 5/22/98	23: 20 15: 11	J.Templa E. Davn	353, 2 9038	

= Not detected at the report limit.

Surrogate

% Recovery

Target Kange

BTEX/GRD Surr., a,a,a-trifluorotoluene

96.

50. - 150.

Report Approved By: That Dull

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### PROJECT QUALITY CONTROL DATA

#### Matrix Spike Recovery

Analyte	units	Orig. Val.	MS Val.	Spike Conc	Recovery	Target Range	ü.C. Batah
Beazene	ng/l	⟨ 0.0010	0.0200	0.0200	180.00	69 123.	1732
Toluene	ng/1	< 0.0010	0.0210	0.0200	105.00	69. <b>- 122.</b>	1752
Ethylbeazene	ng/l	< 0.0010	0.0210	0.0200	105.00	68 124.	1732
Aglenes, total	ng/l	< 0.0010	6.0420	0.0400	105, 60	67 125.	1752
Mathyl-t-butylether	ng/I	< 0.0010	0.0170	0.0200	85.00	66 126.	1732
Arsenic, Total	ng/l	0.1320	0.1810	0.0500	98.00	80 - 120	2241
Darium, Total	ng/l	0.0170	1.800	2.000	89.15	80 - 120	2241
Cadmium, Total	Hg/L	< 0.0010	0.0470	0.0500	94.00	80 - 120	2241
Chronium, Total	ng/l	< 0.0050	0.1340	0.2000	92.00	80 - 120	2241
Lead, Total	ng/l	< 0.0030	0.0475	0.0500	95.00	80 - 120	2241
Mercury, Total	ng/l	< 0.80020	0.60111	0.00100	111.00	80 - 120	2239
Selenium, Total	ng/l	< 0.3850	0.0430	0.0500	86.00	80 - 120	2241
Silver, Total	ng/l	€ 0.0050	0.0420	0.0500	84.00	90 - 120	2241

### Matrix Spike Duplicate

Rnalyte	units	Orig. Val.	Duplicate	RPD	Linit	Q.C. Batch
	-					
Benzene	ng/1	<b>8.020</b> 0	0. 0200	0.00	<b>15</b> .	1732
Toluene	ng/l	0.0210	C. <b>0210</b>	0.00	14.	1732
Ethylbenzene	ng/l	8.0210	0.0210	0.00	14.	1732
Xglenes, total	ng/l	8.0429	0.0420	0.00	16.	1732
Methyl-t-butylether	ng/1	8.0170	0.0170	9.00	19.	1732

#### Laboratory Control Data

Analyte	units	Knoun Val.	Analyzed Val	% Recovery	Target Range	R.C. Batch
Benzene		0,0200	0.0200	100.	70 - 130	1732
	ng/l				70 - 130	1732
Toluene	ng/1	0. 0200	0.0210	105.		
Ethylbenzene	ng/1	8.8200	0.6218	105.	70 - 130	1732
Mylenes, total	ng/l	U. 0400	0.0420	105.	70 - 130	1732
Methyl-t-butylether	ng/l	<b>0.02</b> 00	0. 0190	<b>95</b> .	76 - 130	1732
Arsenic, Total	ng/l	0.0536	0.4628	116.98	80 - 120	2241
Darium, Total	ng/I	0.5040	0.4950	97.83	80 - 120	2241
Cadmium, Total	ng/L	0.0510	U. 0530	103.92	80 - 120	2241
Chronium, Tatal	ng/l	8, 2710	0.2720	100.37	80 - 120	2241
Lead, Total	ng/L	<b>0</b> . <del>3</del> 060	0. 3150	102.29	86 - 120	2241
Mercury, Total	ng/1	0,01299	0.01230	95.35	86 - 120	2239
Selemium, Total	ng/i	0.2030	0. 2120	184, 43	88 - 126	2241
Silver, Total	ng/1	0.0990	0.0970	97.98	80 - 1.20	2241



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#### PROJECT QUALITY CONTROL DATA

#### Blank Data

Analyte	Blank Value	Uaits	Q.C. Batch
Benzene	( 0.0010	ng/l	1732
Taluene	₹ 0.8010	ng/l	1732
Ethylhenzone	< 0.0010	ng/i	1732
Xylanes, total	⟨ 0,6010	ng/L	1732
Methyl-t-butylether	< 0.0010	mg/l	1732
Arsenic, Total	₹ 0,0050	ng/l	2241
Darium, Total	( 0.0100	ng/1.	2241
Cadmium, Total	< 0.0010	Hq/1	2241
Chronium, Total	₹ 0.0050	ng/1	2241
Lead, Total	₹ 0.0030	ng/l	2241
Mercury, Total	< 0.90020	ng/1	2239
Seleaium, Total	₹ 0.0850	ng/1	2241.
Silver, Total	₹ 0.8850	ng/l	2241
		-	



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#### PROJECT QUALITY CONTROL DATA

#### Matrix Spike Recovery

Analyte	units	Drig. Val.	Lev Su	Spike Conc	Recovery	Target Range	R.C. Batch
up a up high data with some differ with film 600 Film (with design).	the total the same when the same						
Denzene	ng/1	< 0.0010	6.0200	G. 0200	100.00	69 123.	736
Toluene	ng/1	< 0.0010	0.8298	0.0200	184.00	69. <b>- 122</b> .	936
Ethylbenzens	ng/1	< 0.0010	G. 0206	0.0200	103.00	<b>68 124</b> .	936
Xylenes, total	ng/1	< 0.0010	0.0415	0.0400	103.75	67 125.	936
Hethyl-t-butyletter	Hg/1	< 0. <b>001</b> 0	0.0159	0.0200	34.50	86. <b>- 12</b> 6.	936
Hitrate-W as W	ng/l	₹ 0.10	9.48	10.0	94,80	85 115.	939
Mitrate-N as N	ng/l	< 0.10	9.50	10.0	95.00	85 115.	939
Sulfate	ng/1	₹ 5,00	10.7	10.0	107.00	76 133.	3232

### Matrix Spike Duplicate

Analyte	units	Drig. Val.	Duplicate	RPD	Limit	R.C. Batch
~ <del>*</del> * * * * * * * * * * * * * * * * * *			****	~~~~~~	****	
Benzene	Mg/1	8.0200	0.0204	1.98	15.	936
Toluese	ng/1	0.0208	0.0211	1.43	14.	938
Ethylbenzene	ng/1	<b>0.02</b> 08	0.0210	1.92	14.	936
Xylemes, total	ng/1	0.0415	3.0420	1.20	16.	936
itethgl-t-butylether	ng./1	0.0169	0.0169	0.00	19.	936
Hitrate-H as H	ng/l	9.48	9.50	0.21	9.	939
Sulfate	ng/1	10.7	11.4	6.33	10.	3232

#### Laboratory Control Data

Analgte	units	Known Val.	Analyzed Val	X Recovery	Target Range	Q.C. Batch
4.1 4.4 (177-120-140 4P 4R) 4P 4R) 4P 4R 4P			*****		and was from the state take the spin of the life.	
lienzene	ng/1	0.0200	0.0203	102.	70 - 130	936
Toluene	ng/1	0.0200	0. 0206	103.	70 - 130	936
Ethylbenzene	ng/1	0.0200	0.0210	105.	70 - 130	936
Xylenes, total	ng/l	0.0400	0.0422	196.	79 - 130	736
Methyl-t-butylether	ng/1	G. <b>02</b> 00	0.0188	94.	70 - 130	936
Methane	ns/L	1.33	1. 20	90.	60 - 140	942
Hitrate-H as H	. ng/l	5.50	5, 58	100.00	80 - 120	939
Sulfate	ng/1	49.7	43. 6	97.79	SC - 120	3232
	Duplicates					

Analyte	units	Orig. Val.	Ouplicate	Kab	Linit	Q.C. Batch
where the first way of the spice of the spice of						
्रस	pH Units	6.19	5.10	0.00	15	937
Hitrate-N as N	mg/l	< 0.10	< 0.16	R/A	15	939
Sulface	ng/1	114.	116.	1.74	15	3232

#### Blank Data

Apalyte	Blank Value	Units	9 C. Ratch
vag may i han some time and with other day with some with some	*****		
Benzene	( 6,0010	Hg/1	936



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#### PROJECT QUALITY CONTROL DATA

#### Rlank Data

	Analyte	Blank Value	Units	A.C. Datch
•				*******
	Toluene	< 0.0010	11g/l	936
	Ethylbenzens	0.190.0	ng/l	ÿ36
1	Mylenes, total	0.0010	ng/1	938
	Hethyl-t-butylather	( 0.0010	Hg/1	938
1	Mitrate-N as N	₹ 0.10	ng/l	939
	Sulfate	( 5.08	ng/l	3232
	Methane	₹ 0.026	ng/L	942

APPENDIX A.2 LABORATORY DATA AUGUST 1998

2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249

DGER BALDWIN 890 TRIANGLE PARKWAY STE 100

VORCROSS, GA 30092

roject: 733430

Project Name: KESSLER LTM

empler: ROGER BALDWIN

Lab Number: 98-A100521 Sample ID: TRIP BLANK

Sample Type: Ground water

Site ID:

Date Collected:

Time Collected:

Date Received: 8/22/98

Time Received: 8:30

Analyte	Result	Units	Report Linit	Quan Linit	Dil Factor	Date	Tine	Analyst	Method	Batch
*VULATILE DREANICS by GC*										
Beuzene	НD	ug/l	1	4	1	8/28/98	7:48	E. Snith	8021B	390
Ethylbenzene	KD	ug/l	<u>.</u> 1	1	1	8/28/98	7:48	E. Snith	8021B	390
Toluene	ND ON	ug/1	ī	1	1	8/28/98	7:48	E. Snith	8021B	390
n,p-Xylenes	КD	ug/l	1	1	1	8/28/98	7:48	E. Snith	80218	390
 o-Xylene	KD ON	ug/l	1	1	1	8/28/98	7:48	E. Snith	8021B	390
NTBE	ND ON	ug/l	1	1	1	8/28/98	7:48	E. Snith	8021B	390
ND = Not detected at the re	port linit.									
					····	•				<del></del>

Surrogate	% Recovery	Target Range
PID Surr., a,a,a-trifluorotolueme	100.	50 150.
Hall Surr., chloroprene	92.	64 130.
Hall Surr., 1-chloro-3-fluorobenzene	74.	65 132.

Report Approved By:

Mikel A. Cum

Report Date: 9/ 4/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

OGER BALDWIN

390 TRIANGLE PARKWAY STE 100

IORCROSS, GA 30092

roject: 733430.5000

roject Name: KEESLER LTM (SWMU 66)

Sampler: ROGER BALDWIN

Lab Number: 98-A99620

Sample ID: SW-2

Sample Type: Water

Site ID:

Date Collected:

8/20/98

Time Collected: 12:00

Date Received:

8/21/98

Time Received:

9:00

Analyte	Result	Units	Report Linit	Ruan Lihit	Dil Factor	Date	Tine	Analyst	Method	[atch
*DRGANIC PARAMETERS*										
Benzene	ND	ug/1	1.0	1.0	1	8/22/98	1:50	T. Johnson	8021B	8868
Tolvese	ND	ug/1	1.0	1.0	1	8/22/98	1:50	T. Johnson	8021B	8868
Ethylbenzene	ND	υg/l	1.0	1.0	1	8/22/98	1:50	T. Johnson	8021B	8868
Xulenes, total	MD DX	ug/l	1.0	1.0	1	8/22/98	1:50	T. Johnson	8021B	8868
Methyl-t-butylether	KD.	ug/1	1.0	1.0	i	8/22/98	1:50	T. Johnson	8021B	886

ND = Not detected at the report limit.

Surrogate

% Recovery

Target Range

BTEX/GRO Surr., a,a,a-trifluorotoluene

93.

50. - 150.

Report Approved By:

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### ANALYTICAL REPORT

ARSONS ENG./KEESLER AFB, MS 8249 DGER BALDWIN 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.5000

roject Name: KEESLER LTM (SWMU 66)

ampler: ROGER BALDWIN

Lab Number: 98-A99623

Sample ID: MW 9-8

Sample Type: Water

Site ID:

Date Collected: 8/20/98

Time Collected: 15:05

Date Received: 8/21/98

9:00 Time Received:

Analyte	Result	Units	Report Linit	Ruan Linit	Dil Factor	Date	Tine	Analyst	Hethod	Ratch
*URGANIC PARAMETERS*										
Benzene	4.0	ug/l	1.0	1.0	1	8/22/98	5: 14	T. Johnson	8021B	8868
Toluene	1.0	ug/1	1.0	1.0	1	8/22/98	5: 14	T. Johnson	8021B	8868
Ethylbenzene	ND	-	1.0	1.0	1	8/22/98	5: 14	T. Johnson	8021B	8868
-	5.0	ug/1	1.0		4	8/22/98	5: 14	T. Johnson	8021B	8866
Xylenes, total		ug/1		1.0			5: 14	T. Johnson	8021B	8868
Methyl-t-butylether	8.0	ug/l	1.0	1.0	1	8/22/98	3. 14	i. Ounnson	0021B	9900
*MISCELLANEDUS GC PARAMETE	82 <b>%</b>									
Methane	6800	ug/l	130.	26.0	5	8/26/98	14:12	W. Klepper	8015N	8739
35% Wel 2002	4044	<b>73</b>		20.0	Ψ	0. 10. 10				
*METALS*	•									
Ferrous Iron	1.12	ng/l	0.100	0.100	1	8/25/98	1: 49	G. Raun	35000	9535
Terroos aron	2.22	//y/ ±	v. 400	0. 100	*	U/ ZU/ / U	4. 77	D. 5-0011	-	7030
*MISCELLANEOUS CHEMISTRY*										
Kitrate-N as N	KD	ng/1	0.10	8,10	1	8/21/98	18:47	J. Temple	353.2	7476
Sulfate		-	50.0	5.00	10	8/28/98	8: 26	J. Tyree	9038	9949
JULT 4CE	93.0	ng/1	JU. U	J. UU	TO	0/ 20/ 70	0. 20	u. i gree	7439	7777
ND = Not detected at the r	anout livit									
DA DAT METEOTER OF THE L	choir TIUTE.									

Surrogate X Recovery Target Range

BTEX/GRO Surr., a,a,a-trifluorotoluene

95.

50. - 150.

Report Approved By:

Report Date: 9/ 3/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### REPORT ANALYTICAL

ARSONS ENG. /KEESLER AFB, MS 8249

OGER BALDWIN

390 TRIANGLE PARKWAY STE 100

IDRCROSS, GA 30092

roject: 733430.5000

roject Name: KEESLER LTM (SWMU 66)

ampler: ROGER BALDWIN

Lab Number: 98-A99625

Sample ID: MW 9-1

Sample Type: Water

Site ID:

8/20/98 Date Collected:

Time Collected: 17:00

Date Received:

8/21/98

Time Received:

9:00

Analyte	Result	Units	Report Linit	Ruan Linit	Dil Factor	Date	Tine	Analyst	Hethod	Kateh
*DRGANIC PARAMETERS*										
Benzene	ØК	ug/l	1.0	1.0	1	8/22/98	6: 05	T. Johnson	8021B	8868
Toluese	DK	ug/l	1.0	1.0	1	8/22/98	<b>6: 05</b>	T. Johnson	8021B	8868
Ethylbenzene	AD.	υg/l	1.0	1.0	1	8/22/98	<b>6: 05</b>	T. Johnson	8021B	8868
Xylemes, total	MD	ug/l	1.0	1.6	1	8/22/98	6: 05	T. Johnson	8021B	8868
Methyl-t-butylether	KD	ug/l	1.0	1.0	1	8/22/98	6: 05	T. Johnson	8021B	8868
*MISCELLANEOUS GC PARAM	ETERS×							•		
Methane	18200	ug/l	260.	26.0	10	8/26/98	14: 33	W. Klepper	8015N	8739
*HETALS*										
Ferrous Iron	0.230	ng/l	0.100	0.100	1	8/25/98	1:49	6. Kaun	35000	9535
*NISCELLANEOUS CHEMISTR	Υ×									
Kitrate-N as N	KD	ng/1	0.10	0.10	1	8/21/98	18:48	J. Tenple	353.2	7476
Sulfate	22.6	ng/l	5.00	5.00	1	8/28/98	8:26	J. Tyree	9038	9949

ND = Not detected at the report limit.

% Recovery Target Range Surrogate

BTEX/GRB Surr., a,a,a-trifluorotolueme

90.

50. - 150.

Report Approved By:

9/ 3/98 Report Date:

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director





2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

#### ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

DGER BALDWIN 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.5000

roject Name: KEESLER LTM (SWMU 66)
ampler: ROGER BALDWIN

Lab Number: 98-A99622

Sample ID: MW 9-2 Sample Type: Water

Site ID:

Date Collected:

8/20/98

Time Collected: 13:45 Date Received:

8/21/98

Time Received:

9:00

Analyte	Result	Units	Report Limit	Quan Linit	0il Factor	Date	Tine	Analyst	Hethod	Batci
UNDOAUTO GAGAMETERO										-
*URGANIC PARAMETERS*	un.	/1	4.0	4.0		A 18A 10A	d - d0	T laborer	00040	0040
Benzene	ND	ug/l	1.0	1.0	1	8/22/98	4: 49	T. Johnson	8021B	8848
Toluene	ИD	ug/l	1.0	1.0	1	8/22/98	4:49	T. Johnson	8021B	8848
Ethylbenzene	HD.	ug/l	1.0	1.0	1 .	8/22/98	4:49	T. Johnson	80218	8848
Xylenes, total	KD ON	ug/l	1.0	1.0	1	8/22/98	4:49	T. Johnson	8021B	8848
Methyl-t-butylether	ND CH	ug/l	1.0	1.0	1	8/22/98	4: 49	T. Johnson	80218	8848
*MISCELLANEDUS GC PARAMETE	RS×									
Methane	5950 J	ug/l	260.	<b>26</b> . 0	10	8/26/98	14: 02	W. Klepper	8015M	8739
*METALS*										
Ferrous Iron	0.450 J	ng/l	0.100	0.100	1	8/25/98	1:49	6. Baun	35000	9535
*MISCELLANEDUS CHEMISTRY*										
Ritrate-N as N	D	ng/l	0.10	0.10	· 1	8/21/98	18: 47	J. Tenple	353.2	7476
Sulfate	40.8 J	ng/l	10.0	5.00	2	8/28/98	8: 26	J. Tyree	9038	9949
ND = Not detected at the r		7. <b>3</b> . —			~			<b>y</b>		

Surrogate

% Recovery

Target Range

BTEX/GRD Surr., a,a,a-trifluorotoluene

101.

50. - 150.

Report Approved Bu:

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



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#### REPORT ANALYTICAL

8249 ARSONS ENG. /KEESLER AFB, MS

OGER BALDWIN

390 TRIANGLE PARKWAY STE 100

IORCROSS, GA 30092

roject: 733430.5000

'roject Name: KEESLER LTM (SWMU 66)

Jampler: ROGER BALDWIN

Lab Number: 98-A99624

Sample ID: MW 9-6 Sample Type: Water

Site ID:

8/20/98 Date Collected:

Time Collected: 16:00

8/21/98 Date Received:

Time Received:

9:00

Analyte	Result	Units	Report Limit	Avan Linit	Dil Factor	Date	Tine	Analyst	Method	Kabeh
, , , , , , , , , , , , , , , , , , ,			<b>4</b>			<del></del>				
*DROMIC PARAMETERS*							- 40		00040	00.00
Benzene	20. 0	ug/1	1.0	1.0	1	8/22/98	5: 40	T. Johnson	8021B	8888
Toluene	2.0	ug/l	1.0	1.0	1	8/22/98	5:40	T. Johnson	8021B	8868
Ethylbenzene	22.0	ug/l	1.0	1.0	1	8/22/98	5: 40	T. Johnson	8021B	8868
Xylenes, total	6.0	ug/l	1.0	1.0	1	8/22/98	5:40	T. Johnson	8021B	8888
Methyl-t-butylether	9.0	ug/l	1.0	1.0	1	8/22/98	5: 40	T. Johnson	8021B	8888
*MISCELLANEOUS GC PARANI	ETERS×									
Methane	8190	ug/l	260.	26.0	10	8/26/98	14: 20	W. Klepper	8015H	8739
*HETALS*										
Ferrous Iron	ND	ng/l	0.100	0.100	1	8/25/98	1: 49	G. Raun	35000	9535
*MISCELLANEOUS CHEMISTR	Υ×									
Kitrate-N as N	ND	ng/l	0.10	0.10	1	8/21/98	18: 37	J. Tenple	353.2	7476
Sulfate	19.2	ng/l	5.00	5.00	1 .	8/28/98	8:26	J. Tyree	9038	9949

ND = Not detected at the report limit.

Surrogate

% Recovers

Target Range

BTEX/SRD Surr., a,a,a-trifluorotoluene

95.

50. - 150.

Report Approved By:

Report Date: 9/ 3/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director

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#### ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS

OGER BALDWIN

B90 TRIANGLE PARKWAY STE 100 NORCROSS, GA 30092

roject: 733430

³roject Name: KESSLER LTM

mampler: ROGER BALDWIN

Lab Number: 98-A100520

Sample ID: SW-3

Sample Type: Ground water

Site ID:

Date Collected:

8/21/98

Time Collected: 13:30

Date Received:

8/22/98

Time Received:

8:30

Analyte	Result	Units	Report Limit	Ruan Linit	Dil Factor	Date	Tine	Analyst	Method	Natch
*VOLATILE DREAMICS by GC*										
Benzene	ND	ug/l	1	1	1	8/28/98	7:08	E. Smith	8021B	390
Ethylbenzene	CK CK	ug/l	1	1	1	8/28/98	7:08	E. Smith	8021B	390
Toluese	ND -	ug/l	1	1	1	8/28/98	7:08	E. Smith	8021B	390
n,p-Xylenes	MD	ug/1	1	1	1	8/28/98	7:08	E. Snith	80218	390
o-Xylene	ND	ug/1	1	1	1	8/28/98	7:08	E. Smith	80218	390
NTIVE	MD	ug/1	1	1	1	8/28/98	7: 08	E. Snith	8021B	390

ND = Not detected at the report limit.

Surrogate	% Recovery	Target Range
PID Surr., a,a,a-trifluorotoluem	e 100.	<b>5</b> 0 150.
Hall Surr., chloroprese	96.	64 130.
Hall Surr., 1-chloro-3-fluoroben	zene 90.	65 132.

Report Approved By:

Nited A. Russe

Report Date: 9/ 4/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



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#### ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS

ROGER BALDWIN

5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.5000

Project Name: KEESLER LTM (SWMU 66)

Sampler: ROGER BALDWIN

Lab Number: 98-A99626

Sample ID: MW 9-10

Sample Type: Water Site ID:

8/20/98 Date Collected:

Time Collected: 18:45

Date Received:

8/21/98

Time Received:

9:00

Analyte	Result	Units	Report Linit	Quan Linit	Dil Factor	Date	Tine	Analyst	Hethod	[ratch
*URGANIC PARAMETERS*										
Benzene	MD .	ug/l	1.0	1.0	1	8/22/98	9:12	T. Johnson	8021B	8868
Toluene	ND	ug/l	1.0	1.0	1	8/22/98	9:12	T. Johnson	8021B	8868
Ethylbenzene	dk	ug/l	1.0	1.0	1	8/22/98	9:12	T. Johnson	8021B	8868
Xylenes, total	<b>D</b>	υ <b>g/</b> 1	1.0	1.0	1	8/22/98	9:12	T. Johnson	8021B	8868
Methyl-t-butylether	2.0	ug/1	1.0	1.0	1	8/22/98	9:12	T. Johnson	8021B	8868
*MISCELLANEOUS GC PARAM	ETERS*									
Methane	687. J	<b>ug/l</b>	26.0	26.0	1	8/26/98	14: 36	W. Klepper	8015M	8739
*METALS*										
Ferrous Iron	0.250 丁	ng/l	0.100	0.100	1	8/25/98	1: 49	6. Kaun	3500D	9535
*MISCELLANEOUS CHEMISTR	Y <b>x</b>									
Hitrate-H as H	ND	ng/l	0.10	0.10	1	8/21/98	18:49	J. Temple	353.2	7476
Sulfate	18.9 J	ng/l	5.00	5.00	1	8/28/98	8:26	J. Tyree	9038	9949

ND = Not detected at the report limit.

Surrogate

% Recovery

Target Range

BTEX/GRO Surr., a,a,a-trifluorotoluene

96.

50. - 150.

Report Approved By:

Report Date:

9/ 3/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director

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#### ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

DGER BALDWIN 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.5000

Project Name: KEESLER LTM (SWMU 66)

ampler: ROGER BALDWIN

Lab Number: 98-A99621

Sample ID: SW-1

Sample Type: Water

Site ID:

Date Collected: 8/20/98

Time Collected: 12:30 Date Received:

8/21/98

Time Received:

9:00

	Analyte	Result	Units	Report Limit	Quan Linit	Dil Factor	Date	Tine	Analyst	Hethod	Ratch
				********							
翻	*URGANIC PARAMETERS*										
	Benzene	MD D	ug/l	1.0	1.0	1	8/22/98	4: 23	T. Johnson	8021B	8868
	Toluene	ND	ug/1	1.0	1.0	1	8/22/98	4: 23	T. Johnson	8021B	8868
	Ethylbenzene	MD	ug/1	1.0	1.0	1	8/22/98	4: 23	T. Johnson	8021B	8848
_	Xylenes, total	MD CK	vg/1	1.0	1.0	1	8/22/98	4: 23	T. Johnson	8021B	8868
	Methyl-t-butylether	ND	ug/l	1.0	1.0	1	8/22/98	4: 23	T. Johnson	8021B	8868

ND = Not detected at the report limit.

Surrogate

% Recovery

Target Range

BTEX/GRU Surr., a,a,a-trifluorotoluene

93.

50. - 150.

Report Approved Bu:

Sunny Sale Report Date: 9/ 3/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



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## ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

OGER BALDWIN

390 TRIANGLE PARKWAY STE 100

IDRCROSS, GA 30092

roject: 733430.5000

roject Name: KEESLER LTM (SWMU 66)

Sampler: ROGER BALDWIN

Lab Number: 98-A99627 Sample ID: TRIP BLANK

Sample Type: Water

Site ID:

Date Collected: 8/20/98

Time Collected: 11:30

Date Received: 8/21/98

Time Received: 9:00

Analyte	Result	Units	Report Limit	Ruan Limit	Dil Factor	Date	Tine	Analyst	Method	Katch
*DRCANIC PARAMETERS*										
Benzene	KD	ug/1	1.0	1.0	1	8/28/98	14: 29	Duncan, J.	8021B	3400
Toluene	ND	ug/l	1.0	1.0	1	8/28/98	14: 29	Duncan, J.	8021B	3400
Ethylbenzene	MD	υg/1	1.0	1.0	1	8/28/98	14: 29	Duncan, J.	8021B	3400
Xylenes, total	ND.	ug/l	1.0	1.0	1	8/28/98	14: 29	Duncan, J.	8021B	3400
Methyl-t-butylether	dk	ug/l	1.0	1.0	1	8/28/98	14: 29	Duncan, J.	8021B	3400

NO = Not detected at the report limit.

Surrogate % Recovery Target Range

BTEX/GRO Surr., a,a,a-trifluorotoluene

96.

50. - 150.

Report Approved By:

Report Date: 9/ 3/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director



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#### PROJECT QUALITY CONTROL DATA

### Matrix Spike Recovery

Analyte	units	Orig. Val.	MS Val	Spike Conc	Recovery	Target Range	Q.C. Batch
Benzene	ng/1	< 0.0010	0.0230	0.0200	115.00	75 125.	8868
Benzene	ng/1	< 0.0010	0.0190	0.0200	95.00	75. <b>- 125</b> .	3400
Toluene	ng/l	< 0.0010	0.0190	0.0200	95.00	70 125.	8868
Toluene	ng/l	< 0.0010	0.0190	0.0200	95.00	70 125.	3400
Ethylbenzene	ng/l	< 0.0010	0.0210	0.0200	105.00	71 129.	8868
Ethylbenzene	ng/l	< 0.0010	0.0190	0.0200	95.00	71 129.	3400
Xylenes, total	ng/l	< 0.0010	0.0200	0.0200	100.00	71. <b>- 133</b> .	8868
Xylenes, total	ng/l	< 0.0010	0.0180	0.0200	90.00	71 133.	3400
Methyl-t-butylether	ng/l	< 0.0010	0.0170	0.0200	85.00	<b>75. - 125</b> .	8868
Methyl-t-butylether	ng/l	< 0.0010	0.0200	0.0200	100.00	75. <b>- 12</b> 5.	3400
Hitrate-N as N	ng/l	< 0.10	9.82	10.0	98, 20	85 115.	7476
Hitrate-N as N	ng/l	< 0.10	9.90	10.0	99.00	<b>85.</b> - <b>115</b> .	7476
Sulfate	ng/l	19.2	39.5	20.0	101.50	76 133.	9949

### Matrix Spike Duplicate

Analyte	units	Orig. Val.	Duplicate	RPD	Linit	Q.C. Batch
Benzene	ng/1	0.0230	0.0230	0.00	20.	8868
Benzene	ng/l	0.0190	0.0200	5.13	20.	3400
Toluene	ng/1	0.0190	0.0190	0.00	20.	8868
Toluene	ng/l	0.0190	0.0210	10.00	20.	3400
Ethylbenzene	ng/1	0.0210	0.0210	0.00	20.	8868
Ethylbenzene	ng/l	9.0199	0.0210	10.00	20.	3400
Xylenes, total	ng/1	0.0200	0.0200	0.00	20.	8868
Xylenes, total	ng/l	0.0180	0.0200	10.53	20.	3400
Methyl-t-butylether	ng/1	0.0170	0.0170	0.00	20.	8868
Methyl-t-butylether	ng/1	0.0200	0.0220	9.52	20.	3400
Mitrate-W as M	ng/1	9.82	9.90	0.81	9.	7476
Sulfate	ng/1	39.5	39. 3	0.51	10.	9949

#### Laboratory Control Data

Analyte	units	Known Val.	Analyzed Val	% Recovery	Target Range	Q.C. Batch
Benzene	ng/1	0.0200	0. 0210	105.	70 - 130	8868
Benzene	ng/1	0.0200	0.0180	90.	70 - 130	3400
Toluene	ng/l	0.0200	0.0210	105.	70 - 130	8868
Toluene	ng/1	0.0200	0.0180	90.	70 - 130	3400
Ethylbenzene	ng/l	0.0200	0.0210	105.	70 - 130	8868
Ethylbenzene	ng/1	0.0200	0.0180	90.	70 - 130	3400
Xylenes, total	ng/1	0.0200	0.0210	105.	70 - 130	8888
Xylenes, total	ng/l	0.0200	0.0180	90.	70 - 130	3400
Hethyl-t-butylether	ng/l	0.0200	0.0210	105.	70 - 1 <del>3</del> 0	8868
Methyl-t-butylether	mg/1	0.0200	0.0200	100.	70 - 130	3400
Methane	ng/L	1.33	1. 20	90.	60 - 140	8739



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# PROJECT QUALITY CONTROL DATA

## Laboratory Control Data

Analyte	uni 	ts Kno	un Val.	Analyzed Val	% Recovery	Target Range	Q.C. Datch
Mitrate-M as M Sulfate	ng/ ng/ Duplic	1 1 4	5.50 9.7	5. 30 50. 0	96.36 100.60	80 - 120 80 - 120	7476 9949
Analyte	units	Drig. Val.	Duplio		Linit	Q.C. Datch	
Ritrate-N as N Sulfate	ng/l ng/l	〈 0.19 12.7	< 0.10 12.8	) H/A 0.78	15 15	7476 9949	

#### Blank Data

Analyte	Klank Value	Units	Q.C. Batch
Denzene	⟨ 0,0010	4.473	6010
Kenzene	⟨ 0.0010	ng/l ng/l	8868 3400
Toluene	⟨ 0.0010	ng/1	8868
Toluene	⟨ 0.0010	ng/1	3400
Ethylbenzene	< 0.0010	ng/l	8868
Ethylbenzene	< 0.0010	ng/l	3400
Xylenes, total	< 0.0010	ng/l	8868
Xylenes, total	₹ 0.0010	ng/1	3400
Hethyl-t-butylether	< 0.0010	ng/l	8868
Methyl-t-butylether	⟨ 0.0010	ng/]	3400
Hitrate-N as N	< 0.10	ng/1	7476
Sulfate	< 5.00	ng/1	9949
Methane	₹ 0.026	ng/L	8739

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PROJECT QUALITY CONTROL DATA

Matrix Spike Recovery

| Analyte | units | Orig. Val. | MS Val | Spike Conc | Recovery | Target Range | Q.C. Batch |
|-------------|-------|------------|--------|------------|----------|--------------|------------|
| | | | | | | | |
| Benzene | ng/l | < 0.0010 | 0.0211 | 0.0200 | 105.50 | 84 118. | 390 |
| Toluene | Hg/1 | < 0.0010 | 0.0211 | 0.0200 | 105.50 | 80 121. | 390 |
| n,p-Xylenes | ng/l | < 0.0010 | 0.0444 | 0.0400 | 111.00 | 78 132. | 390 |

Matrix Spike Duplicate

| Analyte | units | Orig. Val. | Duplicate | RPD | Linit | Q.C. Batch |
|-------------|--------------------------------------|------------|-----------|------|-------|------------|
| | eller dann tarrit unts alle migraten | | | | | |
| Benzene | ng/l | 0.0211 | 0.0208 | 1.43 | 17. | 390 |
| Toluene | ng/l | 0.0211 | 0.0209 | 0.95 | 17. | 390 |
| n,p-Xylenes | ng/l | 0.0444 | 0.0442 | 0.45 | 17. | 390 |

Laboratory Control Data

| Analyte | units | Knoun Val. | Analyzed Val | % Recovery | Target Range | Q.C. Batch |
|--------------|-------|------------|--------------|------------|--------------|------------|
| | | | | | | |
| Benzene | ng/l | 0.0200 | 0.0205 | 102. | 70 - 130 | 390 |
| Ethylbenzene | ng/l | 0.0200 | 0. 0206 | 103. | 70 - 130 | 390 |
| Toluene | ng/1 | 0.0200 | 0.0205 | 102. | 70 - 130 | 390 |
| m,p-Xylenes | ng/l | 0.0400 | 0.0432 | 108. | 70 - 130 | 390 |
| o-Xylene | ng/l | 0.0208 | 0.0215 | 108. | 70 - 130 | 390 |

Blank Data

| Analyte | Blank Value | Units | Q.C. Batch |
|--------------|-------------|-------|-----------------|
| | | | 300 |
| Benzene | < 0.0010 | ng/l | 390 |
| Ethylbenzene | < 0.0010 | ng/l | 390 |
| Toluene | < 0.0010 | ng/l | 3 90 |
| н,p-Xylenes | < 0.0010 | ng/l | 390 |
| o-Xylene | < 0.0010 | ng/l | 390 |
| MTBE | < 0.0010 | ng/l | 390 |



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PARSONS ENG./KEESLER AFB.MS 3249 ROGER BALDWIN 5390 TRIANGLE PARKWAY STE 100 NORDROSS, GA 30092

CHAIN OF CUSTODY

| | CHA | IN | | cus | ГОД | Y | | | | | | | | | |
|----------------------------|--------------------|--------|--------|--------|-------|---------|-----------------------------|---------------|-----------------|--|-----------|-----------------|-----------|--------|-----------|
| Project Aumser: | 133130.5000 | | Sasol | ler: 💪 | qer. | Bald | , או נטי | MEE | Spi | | t | Analys: | s dec | uested | |
| project Name: K | eesler LTM (s | ~~~ 66 | | uote: | 1 | | | <u>6</u> 6 | Jan C | 45 | ر
ن پد | 23 | i | - | |
| _a5 A0. | Field Number | Date | Time | Matrix | Grab | Como | Bottles | | METhan | N. S. | が | 34 | i | i | |
| -A99620 | SW-2 | 8/20 | 1200 | Hzo | X | | 24ml | 1 | | , | | | 1 | - | i |
| 3-A9 9621 | Sw-1 | | 1230 | | | · | 240ml | X | | | | | | | i . |
| 3-4 99622 | mw9-2 | | 1345 | | | | H40ml
1-125ml
1-25ml | X | X | X | K | X. | | 1 | |
| 3-A 99623
 | nu9-8 | | 1202 | | | | 1-1250×L | 义 | \ | X | X | 1 | 1 | - | 1 |
| 8-A99624 | n W 9-6 | | 1000 | | | | 3-125 AL
3-250L | | Ţ | X | X | 7 | * | | !
! |
| 3-A99 625 | mw9-1 | | 1700 | | | | 1-125m
1-125m | X | 1 | X | X | X | | | |
| 8-A 99626 | nw9-10 | | 1845 | | | | 1-125-2
1-25-2
1-25-2 | X | X | X | 1 | X | | | 1 |
| 3-499627 | F.p.Blak | | 1130 | 1 | ↓ | | 240ml | X | | !
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| Relinquisned by: | D/T Receive | ec oy: | | 7/0 | Reiin | cuisnec | : by: | | D/ <sup>-</sup> | R | PU | ec, by: | 3 | 8/20/ | 100 D/T |
| Cooler Temperatur | | W | | | | | I to v | | | | | | | | *, |
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2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

PARSONS ENG./KEESLER AFB, MS 8849 ROGER BALDWIN 5390 TRIANGLE PARKWAY STE 100 NERCROSS, GA 30098

| | CH | O NIE | | cus. | | | | | | | | | |
|--------------------|------------------------------------|---------|---------|------------------|-------------------------|---------|---------|-----------|--------------|---|--------|------------|---------------|
| ject Aumser: 7 | ler: Ro | 9W | Bala | Bottles | | ec . | | | | | | | |
| roject Name: Ke | es lev LTM (s | ivmulb) | SAE | Quote: | | | | 218 | | - | 1 1 | | i |
| w. | Field Kumper | Date | Time | Matrix | Brab | Comp | Bottles | 8 | | | | 1 1 | 1 |
| 100520 | SW-3 | 8/21 | 1330 | H20 | X | | 21/2 | X | - T A | | | 1 1 | 1
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(Fuld Blank) | 8/21 | | H20 | | | 2 1/2 | X | | • | | 1 | 1
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67 |
| Cooler Temperature | Number: (///0/ | SPEC | IAL INS | STRUCTIONS When | l on | e T | v.p.Bl | we a | السع
السع | 1, so | I | | |

Cooler Seals Intact?

Dec-X Air Sill Ausser: 807000 184035

Made my own ~/

APPENDIX A.3 LABORATORY DATA NOVEMBER 1998

2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

DGER BALDWIN 390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.02

Project Name: KESSLER LTM (SWMV66)

ampler: ROGER BALDWIN

Lab Number: 98-A145164

Sample ID: SW-1

Sample Type: Water

Site ID:

Date Collected: 11/18/98

Time Collected: 16:45

Date Received: 11/20/98

Time Received:

| | Analyte | Result | Units | Report
Linit | Ruan
Linit | Dil
Factor | Date | Tine | Analyst | Method | Batch |
|---|---|--------------|-------|-----------------------|---------------|---------------|----------|-------|------------|----------|--------------|
| | رهم وفيد رسيد خدم دوده جديد هاي داول البراء هياد الله فقط الله الله عليه بها هده دود هي هي دود <sub>علي</sub> ه بها | ************ | | *** ** ** ** ** ** ** | | | | | | ******** | |
| | *URGANIC PARAMETERS* | | | | | | | | | | |
| - | Benzene | ND | ug/1 | 1.0 | 1.0 | 1 | 11/30/98 | 0: 31 | T. Johnson | 8021B | 290 3 |
| | Toluene | 1.6 U | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0: 31 | T. Johnson | 8021B | 2903 |
| | Ethylbenzene | ЖĎ | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0: 31 | T. Johnson | 8021B | 2903 |
| 繊 | Xylenes, total | ИD | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0: 31 | T. Johnson | 8021B | 2903 |
| | Methyl-t-butylether | ND | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0: 31 | T. Johnson | 8021B | 2903 |
| | | | | | | | | | | | |

ND = Not detected at the report limit.

Surrogate

% Recoveru

Target Range

BTEX/GRU Surr., a,a,a-trifluorotoluene

105.

50. - 150.

Report Approved By:

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249 ROGER BALDWIN 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.02

Project Name: KESSLER LTM (SWMV66)

Sampler: ROGER BALDWIN

Lab Number: 98-A145162

Sample ID: SW-2 Sample Type: Water

Site ID:

Date Collected: 11/18/98

Time Collected: 14:30 Date Received: 11/20/98

Time R

| ₹ (| e | C | 6 | i | ٧ | 6 | đ | : | 9 | : | 00 | |
|-----|---|---|---|---|---|---|---|---|---|---|----|--|
|-----|---|---|---|---|---|---|---|---|---|---|----|--|

| Analyte | Result | Units | Report
Limit | Quan
Linit | Dil
Factor | Date | Tine | Analyst | Hethod | Batch |
|--|--------|-------|-----------------|---------------|---------------------|----------|--------|------------|--------|-------|
| The way had the last top and any last to the last top the last top the last the last top the last top the last | | | | ~= | *** *** *** *** *** | | | | | es es |
| *ORGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | ND. | ug/l | 1.0 | 1.0 | i | 11/29/98 | 23: 38 | T. Johnson | 8021B | 2903 |
| Toluene | 1.4 U | ug/l | 1.0 | 1.0 | 1 | 11/29/98 | 23: 38 | T. Johnson | 8021B | 2903 |
| Ethylbenzene | ND ON | ug/1 | 1.0 | 1.0 | 1 | 11/29/98 | 23: 38 | T. Johnson | 80218 | 2903 |
| Xylenes, total | ND OH | ug/1 | 1.0 | 1.0 | 1 | 11/29/98 | 23: 38 | T. Johnson | 8021B | 2903 |
| Hethyl-t-butylether | КD | ug/1 | 1.0 | 1.0 | 1 | 11/29/98 | 23: 38 | T. Johnson | 80218 | 2903 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|---|---|--------------|
| 140 440 100 100 100 100 100 100 100 100 | the case and the case and the first and the | |
| | | |
| | | |

BTEX/GRO Surr., a,a,a-trifluorotoluene

103.

50. - 150.

Report Approved By:

Report Date: 11/30/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services

2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

OGER BALDWIN

390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.02

Aroject Name: KESSLER LTM (SWMV66)

ampler: ROGER BALDWIN

Lab Number: 98-A145163

Sample ID: SW-3

Sample Type: Water

Site ID:

Date Collected: 11/18/98

Time Collected: 15:45

Date Received: 11/20/98

Time Received: 9:00

| | Analyte | Result | Units | Report
Linit | Quan
Limit | Dil
Factor | Date | Tine | Analyst | Nethod | Batch |
|-----|----------------------|-----------|-------|-----------------|---------------|---------------|----------|---------------|------------|--------|-------|
| | *URGANIC PARAMETERS* | | | | | | | | | | |
| | Benzene | ИD | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0 : 05 | T. Johnson | 8021B | 2903 |
| ··· | Toluene | 1.4 U | ug/l | 1.0 | 1.0 | i | 11/30/98 | 0:05 | T. Johnson | 80218 | 2903 |
| 1 | Ethylbenzene | ND | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0:05 | T. Johnson | 80218 | 2903 |
| | Xylenes, total | ND | ug/1 | 1.0 | 1.0 | 1 | 11/30/98 | 0:05 | T. Johnson | 8021B | 2903 |
| | Methyl-t-butylether | HD | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0:05 | T. Johnson | 8021B | 2903 |

ND = Not detected at the report limit.

Surrogate

% Recovery

Target Range

BTEX/GRO Surr., a,a,a-trifluorotoluene

103.

50. - 150.

Report Approved By:

Amitchell

Report Date: 11/30/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services

SPECIALIZED ASSAYS, INC. 2960 Foster Creighton Dr.

2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249 ROGER BALDWIN 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.02

Project Name: KESSLER LTM (SWMV66)

Sampler: ROGER BALDWIN

Lab Number: 98-A145165

Sample ID: MW9-1 Sample Tupe: Water

Site ID:

Date Collected: 11/19/98

Time Collected: 9:00 Date Received: 11/20/98

Time Received: 9:00

| Analyte | Result | Units | Report
Linit | Ruan
Linit | Dil
Factor | Date | Тіне | Amalyst | Hethod | Vatch |
|-------------------------|------------|-------|-----------------|---------------|---------------|----------|--------|-------------|--------|-------|
| *URGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | KD | ug/1 | 1.0 | 1.0 | 1 | 11/30/98 | 0:58 | T. Johnson | 8021B | 2903 |
| Toluene | 1.3 W | ug/l | 1.0 | 1.0 | · 1 | 11/30/98 | 0:58 | T. Johnson | 8021B | 2903 |
| Ethylbenzene | MD . | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0: 58 | T. Johnson | 8021B | 2903 |
| Xylenes, total | ND | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 0:58 | T. Johnson | 8021B | 2903 |
| Methyl-t-butylether | KD | ug/1 | 1.0 | 1.0 | i | 11/30/98 | 0: 58 | T. Johnson | 80218 | 2903 |
| *MISCELLANEOUS GC PARAM | ETERS× | | | | | | | | | |
| Methane | 2300 | ug/1 | 26.0 | 26.0 | 1 | 11/23/98 | 13:58 | W. Klepper | 8015M | 2901 |
| *HETALS* | | | | | | | | | | |
| Ferrous Iron | 0.360 | ng/1 | 0.100 | 0.100 | 1 | 11/27/98 | 12: 26 | S. Greuer | 3500D | 5725 |
| *MISCELLANEOUS CHEMISTR | Y X | | | | | | | | | |
| Hitrate-H as H | ND | ng/l | 0.10 | 0.10 | · 1 | 11/20/98 | 17:23 | D. Hoover | 353.2 | 2905 |
| Sulfate | 22.9 | ng/1 | 5.00 | 5.00 | i | 11/25/98 | 16:43 | M. Shockley | 9038 | 4596 |
| 10% 16 5 | | | | | | | | | | |

ND = Not detected at the report limit.

Surrogate % Recovery Target Range

BTEX/GRO Surr., a,a,a-trifluorotoluene

105.

50. - 150.

Report Approved By:

Report Date: 11/30/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249

ROGER BALDWIN

5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.**0**2

\_Project Name: KESSLER LTM (SWMV66)

Sampler: ROGER BALDWIN

Lab Number: 98-A145167

Sample ID: MW9-2 Sample Type: Water

Site ID:

Date Collected: 11/19/98

Time Collected: 11:30

Date Received: 11/20/98

Time Received: 9:00

| Analyte | Result | Units | Report
Limit | Quan
Limit | Dil
Factor | Date | Tine | Analyst | Hethod | Batch |
|------------------------------------|---------------|-------|-----------------|---------------|---------------|----------|--------|-------------|--------|--------------|
| «URGANIC PARAMETERS» | | | | | | | | | | |
| Benzene | ND OH | ug/l | 10.0 | 1.0 | 10 | 11/30/98 | 14:23 | T. Johnson | 8021B | 2903 |
| Toluene | ND | ug/l | 10.0 | 1.0 | 10 | 11/30/98 | 14:23 | T. Johnson | 80218 | 2903 |
| Ethylbenzene | ND. | ug/l | 10.0 | 1.0 | 10 | 11/30/98 | 14:23 | T. Johnson | 8021B | 2903 |
| Kylenes, total | HD | ug/l | 10.0 | 1.0 | 10 | 11/30/98 | 14:23 | T. Johnson | 8021B | 2903 |
| lethyl-t-butylether | KD. | ug/l | 10.0 | 1.0 | 10 | 11/30/98 | 14: 23 | T. Johnson | 8021B | 2903 |
| MISCELLANEDUS GC PARAME
Methane | TERS×
3940 | ug/l | 26.0 | 26. 0 | 1 | 11/23/98 | 14: 11 | N. Klepper | 8015M | 2901 |
| HETALS* | | | | | | | | | | |
| errous Iron | 0.670 | ng/1 | 8.100 | 0.100 | 1 | 11/27/98 | 12:26 | S.Breuer | 35000 | 572 5 |
| MISCELLANEOUS CHEMISTRY | 'x | | | | | | | | | |
| litrate-N as N | ND | ng/l | 0.10 | 0.10 | 1 | 11/20/98 | 17: 34 | D. Hoover | 353. 2 | 2905 |
| Culfate | 50.4 | ng/l | 10.0 | 5.00 | 2 | 11/25/98 | 16: 43 | M. Shockley | 9038 | 4596 |

| Surrogate | % Recovery | Target Range |
|--|------------|--------------|
| BTEX/GRB Surr., a.a.a-trifluorotoluene | 108. | 50 - 150 |

PQL elevated due to sample matrix.



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ANALYTICAL REPORT

Laboratory Number: 98-A145167

Sample ID: MW9-2

Page 2

Report Approved By:

Report Date: 11/30/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

ARSONS ENG. /KEESLER AFB, MS 8249

JORCROSS, GA 30092 5390 TRIANGLE PARKWAY STE 100

.⊇roject: 733430.02

Project Name: KESSLER LTM (SWMV66)
Sampler: ROGER BALDWIN

Lab Number: 98-A145168

Sample ID: MW9-6

Sample Type: Water

Site ID:

Date Collected: 11/19/98

Time Collected: 10:15 Date Received: 11/20/98

Batch

| mpler: | ROGER | BALDWIN | | | lime | K6C61/ | rea. | 7. 00 | | |
|---------|-------|---------|-------|-----------------|---------------|--------|------|---------|--------|--|
| Analyte | | Result | Units | Report
Limit | 0il
Factor | Date | Tine | Analyst | Hethod | |

| Analyte | Result | Units | FIHIE | TIHIE | |
N3C6 | | | 115 6 10 4 | |
|-------------------------|--------|-------|-------|-------|-----|----------|--------|-------------|------------|--------------|
| *URGANIC PARAMETERS* | | | | | | | | • fabrani | 00040 | 2003 |
| Benzene | 9.8 | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 14:50 | T. Johnson | 8021B | 2903 |
| Toluene | 1.7 U | ug/1 | 1.0 | 1.0 | 1 | 11/30/98 | 14:50 | T. Johnson | 80218 | 2903 |
| Ethylbenzene | 5.4 | ug/1 | 1.0 | 1.0 | 1 | 11/30/98 | 14:50 | T. Johason | 8021B | 2903 |
| Xylenes, total | 2.6 | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 14:50 | T. Johnson | 8021B | 2903 |
| Methyl-t-butylether | 3.0 J | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 14:50 | T. Johnson | 80218 | 2903 |
| *HISCELLANEBUS GC PARAH | ETERS× | | | | | | | | | 2004 |
| Methane | 3380 | ug/1 | 26.0 | 26.0 | . 1 | 11/23/98 | 14: 14 | N. Klepper | 8015M | 2901 |
| *HETALS* | | | | | | | | | 3F065 | #70F |
| Ferrous Iron | 0.180 | ng/l | 0.100 | 0.100 | 1 | 11/27/98 | 12:26 | S.Breuer | 3500D | 5 725 |
| *MISCELLANEOUS CHEMISTR | Т | | | | | | | | 383 A | -005 |
| Mitrate-N as N | HD | ng/l | 0.18 | 0.10 | 1 | 11/20/98 | | D. Hoover | 353.2 | 2905 |
| Sulfate | 21. 6 | mq/1 | 5.00 | 5.00 | 1 | 11/25/98 | 16: 43 | M. Shockley | 9038 | 4596 |

ND = Not detected at the report limit.

% Recovery Target Range Surrogate

BTEX/GRD Surr., a,a,a-trifluorotoluene

106.

50. - 150.

Report Approved By:

Report Date: 11/30/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249 ROGER BALDWIN 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.02

Project Name: KESSLER LTM (SWMV66)

Sampler: ROGER BALDWIN

Lab Number: 98-A145166

Sample ID: MW9-8 Sample Type: Water

Site ID:

Date Collected: 11/19/98

Time Collected: 12:30 Date Received: 11/20/98

Time Received: 9:00

| Analyte | Result | Units | Report
Linit | Ruan
Linit | Dil
Factor | Date | Tine | Analyst | Method | Katch |
|--------------------------|--------|-------|-----------------|---------------|---------------|----------|--------|--------------|--------|--------------|
| *URGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | ND | υg/l | 1.0 | 1.0 | 1 | 11/30/98 | 8: 42 | T. Johnson | 8021B | 2903 |
| Toluene | ďВ | ug/1 | 1.0 | 1.0 | 1 | 11/30/98 | 8: 42 | T. Johnson | 8021B | 2903 |
| Ethylbenzene | dк | vg/1 | 1.0 | 1.0 | 1 | 11/30/98 | 8: 42 | T. Johnson | 8021B | 2903 |
| Xylenes, total | KD | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 8: 42 | T. Johnson | 8021B | 2903 |
| Methyl-t-butylether | D | ug/1 | 1.0 | 1.0 | 1 | 11/30/98 | 8: 42 | T. Johnson | 8021B | 2903 |
| *MISCELLANEOUS GC PARAME | TERS× | | | | | | | | | |
| Methane | 3830 | ug/l | 26.0 | 26.0 | 1 | 11/23/98 | 14:08 | W. Klepper | 8015N | 2901 |
| *HETALS* | | | | | | | | | | |
| Ferrous Iron | 1.92 | mg/1 | 0.100 | 0.100 | 1 | 11/27/98 | 12: 26 | S. Greuer | 3500D | 5725 |
| *MISCELLANEOUS CHEMISTRY | /x | | | | | | | | | |
| Kitrate-H as H | ND | ng/l | 0.10 | 0.10 | 1 | 11/20/98 | 17:33 | D. Hoover | 353.2 | 290 5 |
| Sulfate | 63.8 | ng/1 | 10.0 | 5.00 | 2 | 11/25/98 | 16:43 | ff. Shockley | 9038 | 4596 |

ND = Not detected at the report limit.

Report Approved By:

Report Date: 11/30/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

REPORT ANALYTICAL

8249 PARSONS ENG. /KEESLER AFB, MS

ROGER BALDWIN 5390 TRIANGLE PARKWAY STE 100

Project: 733430.02

Project Name: KESSLER LTM (SWMV66)

Project Name: KESSLER L Sampler: ROGER BALDWIN

Lab Number: 98-A145169

Sample ID: MW9-10 Sample Type: Water

Site ID:

Date Collected: 11/19/98

Time Collected: 8:00 Date Received: 11/20/98

Time Received:

9: 00

| Analyte | Result | Vaits | Report
Linit | Quan
Limit | Dil
Factor | Date | Tine | Analyst | Hethod | Batch |
|----------------------------|--------|-------|-----------------|---------------|---------------|----------|--------|-------------|--------|-------|
| *URGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | 10.0 | ug/l | 1.0 | 1.0 | i | 11/30/98 | 17:41 | Duncan, J. | 8021B | 6987 |
| Toluene | 2.0 U | ug/l | 1.0 | 1.0 | i | 11/30/98 | 17:41 | Duncan, J. | 8021B | 6987 |
| Ethylbenzene | 6.0 | ug/1 | 1.0 | 1.0 | 1 | 11/30/98 | 17:41 | Duncan, J. | 8021B | 6987 |
| Xylenes, total | 3.0 | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 17:41 | Duncan, J. | 80218 | 6987 |
| Methyl-t-butylether | 2.8 丁 | ug/l | 1.0 | 1.0 | 1 | 11/30/98 | 17:41 | Duncan, J. | 8021B | 6987 |
| *MISCELLANEBUS GC PARAMETI | ERS× | | | | | | | | | |
| Methane | 4030 | ug/l | 26.0 | 26.0 | 1 | 11/23/98 | 14: 18 | W. Klepper | 8015M | 2901 |
| *METALS* | | | | | | • | | | | r |
| Ferrous Iron | 0.160 | ng/l | 0.100 | 0.100 | 1 | 11/27/98 | 12:26 | S.Breuer | 35000 | 5725 |
| *HISCELLANEBUS CHEMISTRY* | | | | | | | | | | |
| Nitrate-N as N | MD | ng/l | 0.10 | 0.10 | 1 | 11/20/98 | 17: 35 | D. Hoover | 353.2 | 2905 |
| Sulfate | 22. 1 | ng/l | 5.00 | 5.00 | 1 | 11/25/98 | 16:43 | M. Shockley | 9038 | 4596 |
| ND = Not detected at the | | · | 3.00 | 3. 00 | 1 | 11/59/38 | 10:43 | n. Snockleg | 7036 | 43 |

Surrogate % Recovery Target Range 104. BTEX/GRU Surr., a,a,a-trifluorotoluene 50. - 150.

Report Approved By:

Report Date: 11/30/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services

2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249 ROGER BALDWIN

5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 733430.02

Project Name: KESSLER LTM (SWMV66)

Sampler: ROGER BALDWIN

Lab Number: 98-A145161 Sample ID: TRIP BLANK Sample Type: Water

Site ID:

Date Collected: 11/18/98 Time Collected: 14:00 Date Received: 11/20/98

Time Received: 9:00

| Analyte | Result | Units | Report
Limit | Quan
Linit | Dil
Factor | Date | Tine | Analyst | Hethod | Natch |
|----------------------|----------|-------|-----------------|---------------|---------------|----------|--------|------------|--------|---------------|
| *DRGANIC PARAMETERS* | | | | | | | | | | |
| Renzene | ND | ug/1 | 1.0 | 1.0 | 1 | 11/29/98 | 23: 12 | T. Johnson | 8021B | 2 9 03 |
| Toluene | 3.1 | ug/1 | 1.0 | 1.0 | i | 11/29/98 | 23: 12 | T. Johnson | 8021B | 29 03 |
| Ethylbenzene | ND. | ug/1 | 1.0 | 1.0 | 1 | 11/29/98 | 23:12 | T. Johnson | 8021B | 2 9 03 |
| Xylenes, total | ЖĎ | ug/l | 1.0 | 1.0 | ī | 11/29/98 | 23:12 | T. Johnson | 8021B | 2 9 03 |
| Methyl-t-butylether | ND
DK | ug/l | 1.0 | 1.0 | i | 11/29/98 | 23: 12 | T. Johnson | 8021B | 2903 |

ND = Not detected at the report limit.

Surrogate % Recovery Target Range

BTEX/GRD Surr., a,a,a-trifluorotoluene

104.

50. - 150.

Report Approved By:

Report Date: 11/30/98

Theodore J. Duello, Ph.D., Q.A. Officer Michael H. Dunn, M.S., Technical Director Danny B. Hale, M.S., Laboratory Director Johnny A. Mitchell, Dir. Technical Services



SPECIALIZED ASSAYS, INC.

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PROJECT QUALITY CONTROL DATA

Matrix Spike Recovery

| Analyte | units | Orig. Val. | MS Val | Spike Conc | Recovery | Target Range | Q.C. Batch |
|---------------------|-------|------------|--------|------------|----------|----------------------------|------------|
| Benzene | ng/1 | ⟨ 0.0010 | 0.0161 | 0.0200 | 80.50 | 75 125. | 2903 |
| Benzene | ng/l | < 0.0010 | 0.0190 | 0.0200 | 95.00 | 75 125 . | 6987 |
| Toluene | ng/l | < 0.0010 | 0.0170 | 0.0200 | 85.00 | 70 125. | 2903 |
| Toluene | ng/l | < 0.0010 | 0.0190 | 0.0200 | 95.00 | 70 125. | 6987 |
| Ethylbenzene | ng/1 | < 0.0010 | 0.0159 | 0.0200 | 79.50 | 71 129. | 2903 |
| Ethylbenzene | ng/l | < 0.0010 | 0.0190 | 0.0200 | 95.00 | 71 129. | 6987 |
| Xulenes, total | ng/l | < 0.0010 | 0.0329 | 0.0400 | 82, 25 | 71 133. | 2903 |
| Xylenes, total | ng/l | < 0.0010 | 0.0200 | 0.0200 | 100.00 | 71 133. | 6987 |
| Methyl-t-butylether | ng/l | < 0.0010 | 0.0199 | 0.0200 | 99.50 | 75 125. | 2903 |
| Methyl-t-butylether | ng/l | < 0.0010 | 0.0220 | 0.0200 | 110.00 | 75. - 125 . | 6987 |
| Nitrate-N as N | ng/l | < 0.10 | 10.4 | 10.0 | 104.00 | 85 115. | 2905 |
| Nitrate-N as N | ng/l | < 0.10 | 10.3 | 10.0 | 103.00 | 85 . - 115 . | 2905 |
| Sulfate | ng/l | 11.6 | 31.9 | 20.0 | 101.50 | 76 133. | 4596 |

Matrix Spike Duplicate

| Analyte | units | Orig. Val. | Duplicate | RPO | Linit | Q.C. Batch |
|---------------------|-------|---------------|-----------|--------------|-------|------------|
| Benzene | ng/1 | 0.0161 | 0.0187 | 14.94 | 20. | 2903 |
| Benzene | ng/l | 0.0190 | 0.0200 | 5.13 | 20. | 6987 |
| Toluene | ng/l | 0.0170 | 0.0196 | 14.21 | 20. | 2903 |
| Toluene | ng/1 | 0.0190 | 0.0200 | 5.13 | 20. | 6987 |
| Ethylbenzene | ng/l | 0.0159 | 0.0186 | 15.65 | 20. | 2903 |
| Ethylbenzene | ng/l | 0.0190 | 0.0200 | 5.13 | 20. | 6987 |
| Xylenes, total | ng/l | 0.0329 | 0.0384 | 15.43 | 20. | 2903 |
| Xylenes, total | ng/l | 0.0200 | 0.0210 | 4.88 | 20. | 6987 |
| Methyl-t-butylether | ng/l | 8.0199 | 0.0230 | 14, 45 | 20. | 2903 |
| Methyl-t-butylether | ng/l | 0.0220 | 0. 9200 | 9.52 | 20. | 6987 |
| Nitrate-N as N | ng/l | 10.4 | 10.3 | 0.97 | 9. | 2905 |
| Sulfate | ng/1 | 31.9 | 36.6 | 13.72# | 10. | 4596 |

Laboratory Control Data

| Analyte | units | Knoun Val. | Analyzed Val | % Recovery | Target Range | Q.C. Batch |
|---------------------|-------|------------|--------------|------------|--------------|------------|
| Benzene | ng/1 | 0.0200 | 0.0180 | 90. | 70 - 130 | 2903 |
| Benzene | ng/1 | 0.0200 | 0.0200 | 100. | 70 - 130 | 6987 |
| Toluene | ng/l | 0.0200 | 0.0177 | 88. | 70 - 130 | 2903 |
| Toluene | ng/1 | 0.0200 | 0.0200 | 100. | 70 - 130 | 6987 |
| Ethylbenzene | ng/1 | 0.0200 | 0.0176 | 88. | 70 - 130 | 2903 |
| Ethglbenzene | ng/l | 0.0200 | 0.0200 | 100. | 70 - 130 | 6987 |
| Xylenes, total | ng/1 | 0.0400 | 0.0365 | 91. | 70 - 130 | 2903 |
| Xylenes, total | ng/1 | 0.0200 | 0.0210 | 105. | 70 - 130 | 6987 |
| Methyl-t-butylether | ng/l | 0.0200 | 0.0219 | 110. | 70 - 130 | 2903 |
| Methyl-t-butylether | ng/L | 0.0200 | 0.0200 | 100. | 70 - 130 | 6987 |
| Methane | ng/L | 1.33 | 1. 30 | 98. | 60 - 140 | 2901 |



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PROJECT QUALITY CONTROL DATA

Laboratory Control Data

| Analyte | unit | :s Kno | un Val. A | nalgzed Val | % Recovery | Target Range | R.C. Batch |
|---------------------------|-------------------------|----------------|----------------|----------------|--------------------|----------------------|--------------|
| Mitrate-M as M
Sulfate | ng/]
ng/]
Duplica | 4 | 5. 50
19. 7 | 5. 80
50. 8 | 105. 46
102. 21 | 80 - 120
80 - 120 | 2905
4596 |
| Analyte | units | Orig. Val. | Duplicate | e RPD | Linit | Q.C. Batch | |
| Nitrate-N as N
Sulfate | ng/l
ng/l | < 0.10
12.3 | < 0.10
14.1 | N/A
13.64 | 15
15 | 2905
4596 | |

Blank Data

| Analyte | Blank Value | Units | Q.C. Batch |
|---------------------|-------------|--------------|------------|
| Benzene | ⟨ 0, 8010 | ng/1 | 2903 |
| Benzene | ⟨ 0.8010 | ng/1
ng/1 | 6987 |
| Toluene | ⟨ 0.0010 | ng/1 | 2903 |
| Toluene | ₹ 0.0010 | ng/1 | 6987 |
| Ethylbenzene | < 0.0010 | ng/l | 2903 |
| Ethylbenzene | < 0.0010 | Hg/1 | 6987 |
| Xylenes, total | < 0.0010 | ng/1. | 2903 |
| Xylenes, total | < 0.0010 | ng/1 | 6987 |
| Methyl-t-butylether | < 0.0010 | ng/1 | 2903 |
| Methyl-t-butylether | < 0.0010 | ng/1 | 6987 |
| Hitrate-H as H | < 0.10 | ng/1 | 2905 |
| Sulfate | ₹ 5.00 | ng/1 | 4596 |
| Methane | < 0.026 | ng/L | 2901 |



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177 PARSONS ENG./KEESLER AFB.MS 8249 ROGER BALDWIN 5390 TRIANSLE PARKWAY STE 100 NORCROSS, GA 30092

CHAIN OF CUSTODY

| | CHA | 4114 C | | | | ·
 | | | | | | | | |
|-------------------|----------------------|-----------|--|----------------------|--------|---------|---------|-----------|------------|-------------|--------|-------------------|--------------|--------|
| Project Number: 7 | 33430.02 | | Samol | er: Roy | er B | aldw | in_ | ~ | | | | Re پیزه Re
پیز | :GVESTEG | i
 |
| Project Name: Kee | sler LTM (Swa | 4166) | SAE S | uote: | | | | 80218 | 3.7 | 5.4 | 3580 | RETHANG | | 1 |
| Lab No. | Field Mumber | Date | Tipe | Matrix | Grab | Como | Bottles | ဆ | 35 | 37 | 8 | ¥ | | |
| -A145161 | TB-1 | 11/18/198 | 1400 | H20 | χ | | 1 | 1 | | | | | | |
| -A145162 | SW-2 | | 1430 | \ | X | | 2 | 2 | 1 | | | | | |
| -A145163 | Sw-3 | | 1545 | | X | | 2 | 2 | | 1 | | | | |
| -A145164 | Sw-1 | <u> </u> | 1645 | | X | | 7 | 2 | ! | | | | | : |
| 2-A145165 | MW9-1 | 11/19/98 | 0900 | | X | | 15 | | | | Berth | | | |
| 8-A145166 | MW9-8 | | 123 | | X | | 5 | | | | Hie | 2 | 1 | |
| 8-A145167 | MW9-2 | | 1130 | | X | | 5 | 2 | 1 | Bui | 1 | 2 | _ | |
| 8-A145168 | mw9-6 | | 1015 | | X | | 5 | 2 | -! } | ∸1 • | 1 | | | |
| -A145169 | MW 9-10 | | 080 | | X | | 5 | 2 | - } | +1 | 7 | 2 | | |
| Relinguished by: | 11/19/198 | ived by: | Program of the state of the sta | D/T | Reli | nguishe | d by: | 1 | D/T | | Receiv | veq på: | | D/T |
| Relinquished by: | D/T RECE | ived by: | | D/T | Reli | navishe | d by: | | D/T | | Recei | Boly - | <u>1</u> | 1/20/9 |
| | | | | | | | | 7 | | | | | | |
| Cooler Temperatur | e When Recevied: 4/2 | SPI SPI | CIAL I | STRUCTION | "51 M | w9- | l is | MS
(MS | 5 M | () | | د میآ | . 7 | |
| Laboratory Projec | t Number: (213 | 07 | | | 8 | 0218 | blem c | ン! で.
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D | | _]] | i La | ' 3
8~964 | -202 |
| Cooler Seals Inte | ict? | 353 | .2 -J | oitate | Ţ | _ | | | | | 280 | on ot | J (V (| O 11 |
| -X Air Bill No | inter: 808218736 | 077 375 | | suifale
erroris I | ren | Rskso | P175 - | ME | HANE | F
 | | | | |
| • | | | | | - | | | | | | | | | |

APPENDIX A.4 LABORATORY DATA JUNE 1999



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249 ROSS SURRENCY 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30072

Project: 735628.03

Project Name: KEESLER A.F.B.

Sampler: BURKINGSTOCK

Lab Number: 99-A95496 Sample ID: SWMU 66-SW 1

Sample Type: Water

Site ID:

Date Collected: 6/22/99 Time Collected: 15:30

Date Received: 6/26/99

Time Received: 9:00

| Result | Units | Linit | Quan
Linit | DI1
Factor | Date | Tine | Analyst | Method | Batch |
|--------|---------------|-------------------------------|---|---|---|--|---|---|---|
| | | ****** | | ***** | *************************************** | | tal its and its and also appears are an | | |
| | | | | | | | | | |
| ND | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 22: 38 | D. Raney | 80218 | 7193 |
| MD | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 22: 38 | D. Raney | 8021B | 7193 |
| ND | υg/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 22: 38 | D. Raneu | 8021B | 7193 |
| ND | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 22: 38 | D. Ranes | 8021B | 7193 |
| ND | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 22: 38 | D. Raney | 8021B | 7193 |
| | ND
D
ON | ND ug/1
ND ug/1
ND ug/1 | ND Ug/1 1.0
ND Ug/1 1.0
ND Ug/1 1.0 | ND Ug/1 1.0 1.0
ND Ug/1 1.0 1.0
ND Ug/1 1.0 1.0 | ND ug/1 1.0 1.0 1
ND ug/1 1.0 1.0 1
ND ug/1 1.0 1.0 1 | ND ug/l 1.0 1.0 1 7/4/99
ND ug/l 1.0 1.0 1 7/4/99
ND ug/l 1.0 1.0 1 7/4/99 | ND ug/l 1.0 1.0 1 7/ 4/99 22:38
ND ug/l 1.0 1.0 1 7/ 4/99 22:38
ND ug/l 1.0 1.0 1 7/ 4/99 22:38 | ND ug/l 1.0 1.0 1 7/ 4/99 22:38 D.Ramey ND ug/l 1.0 1.0 1 7/ 4/99 22:38 D.Ramey ND ug/l 1.0 1.0 1 7/ 4/99 22:38 D.Ramey ND ug/l 1.0 1.0 1 7/ 4/99 22:38 D.Ramey | ND ug/l 1.0 1.0 1 7/ 4/99 22:38 D.Ramey 8021B ND ug/l 1.0 1.0 1 7/ 4/99 22:38 D.Ramey 8021B ND ug/l 1.0 1.0 1 7/ 4/99 22:38 D.Ramey 8021B |

ND = Not detected at the report limit.

BTEX/GRO Surr., a,a,a-trifluorotoluene

87.

50. - 150.

Report Approved By:

I wil adage

Report Date: 7/16/99

Theodore J. Duello, Ph.D., Lab Director Michael H. Dunn, M.S., Technical Director Johnny A. Mitchell, Dir. Technical Services Eric Smith, Assistant Technical Director

Gail A Lage, Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8247 ROSS SURRENCY 5390 TRIANGLE PARKWAY STE 100 NORCROSS, GA 30092

Project: 735628.03

Project Name: KEESLER A. F. B.

Sampler: BURKINGSTOCK

Lab Number: 99-A95512 Sample ID: SWMU 66-5W-2

Sample Type: Water

Site ID:

Date Collected: 6/22/99 Time Collected: 14:30

Date Received: 6/26/99

Time Received: 9:00

| Analyte | Result | Units | Report
Linit | Quan
Linit | Dil
Factor | Date | Tine | Analyst | Nethod | Batch |
|----------------------|---|-------------------|---|---------------|---------------|---------|--------|---|--------|-------|
| | *************************************** | ## FF 60 60 60 60 | *************************************** | | | | | *************************************** | | |
| *URGANIC PARAMETERS* | | | | • | | | | | | |
| lienzene | ND | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 20:57 | S. Stuart | 8021E | 7198 |
| Toluene | ND | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 20: 57 | S. Stuart | 8021B | 7198 |
| Ethylbenzene | ND | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 20:57 | S. Stuart | 8021B | 7198 |
| Xylenes, total | ND | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 20: 57 | S. Stuart | 80211 | 7198 |
| Methyl-t-butylether | ND | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 20: 57 | S. Stuart | 8021K | 7198 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|--|------------|--------------|
| MTEX/GRD Surr., a,a,a-trifluorotoluene | 100. | 50 - 150 |

Report Approved By: Quala day

Report Date: 7/16/99

Theodore J. Duello, Ph.D., Lab Director Michael H. Dunn, M.S., Technical Director Johnny A. Mitchell, Dir. Technical Services Eric Smith, Assistant Technical Director Gail A Lage, Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS ROSS SURRENCY 5370 TRIANGLE PARKWAY STE 100 NORCROSS, GA 30072

Project: 735628.03

Project Name: KEESLER A. F. B.

Sampler: BURKINGSTOCK

Lab Number: 99-A95495 Sample ID: SWMU 66-SW 3

Sample Type: Water

Site ID:

Date Collected: 6/22/99 Time Collected: 15:00 Date Received: 6/26/99

Time Received:

9:00

| Analyte | Result | Units | Report
Linit | Quan
Linit | DI1
Factor | Date | Tine | Analgst | Nethod | Batch |
|---|--------|-------|-----------------|---------------|---------------|---------|--------|----------|---|-------|
| *************************************** | | | | | | **** | | | *************************************** | |
| *URGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | ND | uq/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 22: 89 | D. Raneg | 8021B | 7193 |
| Toluene | ND ON | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 22:09 | D. Raneg | 8021B | 7193 |
| Ethylbenzene | ND | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 22:09 | D. Raneu | 80218 | 7193 |
| Xylenes, total | MD OH | ug/1 | 1.8 | 1.0 | 1 | 7/ 4/99 | 22: 89 | D. Raney | 8021B | 7193 |
| Methyl-t-butylether | ИD | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 22: 89 | D. Raney | 8021R | 7193 |

ND = Not detected at the report limit.

| Surrogate | % Recovery | Target Range |
|--|------------|---|
| 10. ml av 100 av 41, to 10. ml av 40 av 10 | | *************************************** |
| RTEX/GRD Surr., a,a,a-trifluorotolueme | 88. | 50 150. |

Report Approved By: Mail adage

Report Date:

Theodore J. Duello, Ph.D., Lab Director Michael H. Dunn, M.S., Technical Director Johnny A. Mitchell, Dir. Technical Services Eric Smith, Assistant Technical Director Gail A Lage, Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249

ROSS SURRENCY

5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30072

Project: 735628.03

Project Name: KEESLER A.F.B.

Sampler: BURKINGSTOCK

Lab Number: 77-A75478

Sample ID: SWMU 66-MW 9-1

Sample Type: Water

Site ID:

Date Collected: 6/22/99

Time Collected: 16:30

Date Received: 6/26/99

Time Received: 9:00

| Analyte | Result | Units | Report
Limit | Auan
Limit | Dil
Factor | Date | Tine | Analyst | Nethod | Batch |
|---------------------------|--------|-------|-----------------|---------------|---------------|---------|--------|------------|---------|-------|
| *URGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | HD | ug/l | 1.0 | 1.0 | 1 | 7/ 3/99 | 22: 38 | S. Stuart | 80218 | 7202 |
| Toluene | 2.9 | ug/1 | 1.0 | 1.0 | 1 | 7/ 3/99 | 22: 38 | S. Stuart | 8021B | 7202 |
| Ethylbenzene | DA | ug/l | 1.0 | 1.0 | 1 | 7/ 3/99 | 22: 38 | S. Stuart | 8021B | 7202 |
| Xylenes, total | 4. 9 | ug/l | 1.0 | 1.0 | 1 | 7/ 3/99 | 22: 38 | S. Stuart | 80218 | 7202 |
| Methyl-t-butylether | ND | ug/l | 1.0 | 1.0 | 1 | 7/ 3/99 | 22: 38 | S. Stuart | 8021B | 7202 |
| *MISCELLANEOUS GC PARAMET | ers× | | | | | | | | | |
| Methane | 259. | ug/l | 26.0 | 26.0 | 1 | 7/ 6/99 | 19:21 | ff. Rogers | rsk175n | 4622 |

HD = Not detected at the report limit.

BTEX/GRO Surr., a,a,a-trifluorotoluene

104.

50. - 150.

Report Approved Bu:

chail adage

Report Date: 7/

7/16/99

Theodore J. Duello, Ph.D., Lab Director Michael H. Dunn, M.S., Technical Director Johnny A. Mitchell, Dir. Technical Services Eric Smith, Assistant Technical Director

Gail A Lage, Technical Services



SPECIALIZED ASSAYS, INC.

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ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS

ROSS SURRENCY

5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 735628.03

Project Name: KEESLER A.F.B.

Sampler: BURKINGSTOCK

Lab Number: 99-A95488

Sample ID: SWMU 66-MW 9-2

Sample Type: Water

Site ID:

Date Collected:

6/23/99

Time Collected: 16:00

Date Received:

6/26/99

Time Received:

9:00

| Analyte | Result | Units | Report
Limit | Quan
Linit | Dil
Factor | Date | Тіне | Analyst | Method | Batch |
|---------------------------|--------|-------|-----------------|---------------|---------------|---------|-------|-----------|---------|-------|
| | | | | | | | | | | |
| *BRGANIC PARAMETERS* | | | | | | | | | | |
| Kenzene | ИD | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:46 | D. Raney | 8021R | 7193 |
| Toluene | D | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:46 | D. Raney | 8021E | 7193 |
| Ethylbenzene | KD | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:46 | D. Raney | 8021B | 7193 |
| Xylenes, total | MD | υg/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:46 | D. Raney | 8021B | 7193 |
| Methyl-t-butylether | DK | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:46 | D. Raney | 8021B | 7193 |
| *MISCELLAHEDUS GC PARAMET | ers* | | | | | | | | | |
| Hethane | 1440 | ug/l | 26.0 | 26.0 | 1 | 7/ 6/99 | 18:12 | n. Rogers | RSK175M | 4622 |
| | | | | | | | | | | |

ND = Not detected at the report limit.

Surrogate % Recovery Target Range BTEX/GRU Surr., a,a,a-trifluorotoluene 86. 50. - 150.

Report Approved By: Olas Coac

Report Date: 7/16/99

Theodore J. Duello, Ph.D., Lab Director Michael H. Dunn, M.S., Technical Director Johnny A. Mitchell, Dir. Technical Services Eric Smith, Assistant Technical Director Gail A Lage, Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249 ROSS SURRENCY 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30072

Project: 735628.03

Project Name: KEESLER A.F.B.

Sampler: BURKINGSTOCK

Lab Number: 99-A95497

Sample ID: SWMU 66-MW 9-6

Sample Type: Water

Site ID:

Date Collected:

6/22/99

Time Collected: 16:00

Date Received:

6/26/99

Time Received:

9:00

| Analyte | Result | Units | Report
Linit | Ruan
Linit | DI1
Factor | Date | Tine | Analyst | Nethod | Batch |
|---------------------------|--------|---------------|-----------------|---------------|---|---------|--------|------------|---------|--------------|
| | | | | | *************************************** | | | | | |
| *URGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | ND | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 23:07 | D. Raney | 8021B | 7193 |
| Toluene | HD | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 23:07 | D. Raney | 8021B | 7193 |
| Ethylbenzene | ND | ug/1 | 1.0 | 1.8 | 1 | 7/ 4/99 | 23:07 | D. Raney | 80218 | 7193 |
| Xylenes, total | HD | υ <u>σ</u> /1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 23: 07 | D. Raney | 8021B | |
| Nethyl-t-butylether | HD | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 23: 07 | D. Raney | 8021R | 7193
7193 |
| *MISCELLANEOUS GC PARAMET | ERS× | | | | | | | | | |
| Methane | 532. | ug/l | 26.0 | 26.0 | i | 7/ 6/99 | 19:16 | ff. Rogers | rsk175h | 4622 |

KD = Not detected at the report limit.

Surrogate % Recovery Target Range

RTEX/GRB Surr., a,a,a-trifluorotoluene

91.

50. - 150.

Report Approved By:

has adas

Report Date: 7/16/99

Theodore J. Duello, Ph.D., Lab Director Michael H. Dunn, M.S., Technical Director Johnny A. Mitchell, Dir. Technical Services Eric Smith, Assistant Technical Director Gail A Lage, Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS

ROSS SURRENCY

5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30092

Project: 735628.03

Project Name: KEESLER A.F.B.

Sampler: BURKINGSTOCK

Lab Number: 99-A95489

Sample ID: SWMU 66-MW 9-7

Sample Type: Water

Site ID:

Date Collected:

6/23/99

Time Collected: 16:30

Date Received:

6/26/99

Time Received:

9:00

| Analyte | Result | Units | Report
Limit | Ruan
Linit | Dil
Factor | Date | Tine | Analyst | Nethod | Batch |
|--|---|-----------|-----------------|---------------|-----------------------------|---|-------|-----------|---------|-------|
| day and the last stop and after the sign stop that state from some state two with the sign and the same state that | 40° 40° 40° 40° 40° 40° 40° 40° 40° 40° | u aamenne | | | *** ←* ···· ··· ··· ··· ··· | 400 400 400 400 400 400 400 400 400 400 | | | | ***** |
| *URGANIC PARAMETERS* | | | | | | | | | | |
| Benzene | 44.5 | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 17:15 | D. Raney | 8021B | 7193 |
| Toluene | 47.7 | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 17:15 | D. Raney | 8021B | 7193 |
| Ethylbenzene | 24. 6 | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 17:15 | D. Raney | 8021E | 7193 |
| Xulenes, total | 154. | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 17:15 | D. Raney | 8021B | 7193 |
| Methyl-t-butylether | 1.6 | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 17:15 | D. Raney | 8021B | 7193 |
| *MISCELLANEOUS GC PARAME | TERS× | | | | | | | | | |
| Methane | 4840 | ug/l | 26.0 | 26.0 | 1 | 7/ 6/99 | 18:18 | N. Rogers | rsk175H | 4622 |

HD = Hot detected at the report limit.

% Recovery Surrogate

Target Range

RTEX/GRB Surr., a,a,a-trifluorotoluene

93.

50. - 150.

Report Approved Bu:

Mais adage

Report Date:

7/16/99

Theodore J. Duello, Ph.D., Lab Director Michael H. Dunn, M.S., Technical Director Johnny A. Mitchell, Dir. Technical Services Eric Smith, Assistant Technical Director Gail A Lage, Technical Services



2960 Foster Creighton Dr. P.O. Box 40566 Nashville, TN 37204-0566 Phone 1-615-726-0177

ANALYTICAL REPORT

PARSONS ENG. /KEESLER AFB, MS 8249 ROSS SURRENCY 5390 TRIANGLE PARKWAY STE 100

NORCROSS, GA 30072

Project: 735628.03

Project Name: KEESLER A. F. B.

Sampler: BURKINGSTOCK

Lab Number: 99-A95487

Sample ID: SWMU 66-MW 9-8

Sample Type: Water

Site ID:

Date Collected: 6/23/99

Time Collected: 15:30

Date Received: 6/26/99 Time Received: 7:00

| Analyte | Result | Units | Report
Linit | Quan
Limit | Dil
Factor | Date | Tine | Analyst | Method | Batch |
|---------------------------|--------|-------|-----------------|---------------|---------------|---------|-------|-----------|---------|-------|
| *URSANIC PARAMETERS* | | | | | | | | | | |
| Renzene | 232. | Ug/1 | 5.0 | 1.0 | 5 | 7/ 4/99 | 16:17 | D. Raney | 8021K | 7193 |
| Toluene | 41.0 | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:17 | D. Raneu | 8021R | 7193 |
| Ethylbenzene | 7.7 | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:17 | D. Raney | 8021R | 7193 |
| Xylenes, total | 209. | ug/l | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:17 | D. Raneu | 8021B | 7193 |
| Nethyl-t-butylether | ND | ug/1 | 1.0 | 1.0 | 1 | 7/ 4/99 | 16:17 | D. Raney | 8021B | 7193 |
| *MISCELLANEBUS GC PARAMET | ERS* | | | | | | | | | |
| Methane | 2630 | ug/1 | 26.0 | 26.0 | 1 | 7/ 6/99 | 17:53 | M. Rogers | RSK175M | 4622 |

HD = Hot detected at the report limit.

| Surrogate | % Recovery | Target Range |
|--|------------|--------------|
| BTEX/GRU Surr., a,a,a-trifluorotoluene | 74. | 50 150. |

Report Approved By: Uw Way

Report Date:

Theodore J. Duello, Ph.D., Lab Director Michael H. Dunn, M.S., Technical Director Johnny A. Mitchell, Dir. Technical Services Eric Smith, Assistant Technical Director Gail A Lage, Technical Services

APPENDIX B
GROUNDWATER SAMPLING FORMS

Sampling Location AAFES, Marina, AOC-A, WMU 66 SWMU 64 Sampling Dates 6/22/99

| GROUND WA | TER SAMF | LING RE | CORD - | MONITO | RING WE | CLL 54 | vm use s | SW/ |
|-------------|---|---------------------------------------|------------|----------------|------------------------------|------------------|---------------------------------------|--|
| REASON FOR | | | | | | | | (number) |
| DATE AND TI | | | | | | | a.m./p.m | |
| SAMPLE COL | LECTED B | Y:BKB/ | BL of Pa | arsons ES | | | | • |
| WEATHER: | Sunny (| mostly | A CLUBEA | (E) T (D) | | | | |
| DATUM FOR | WAIERDI | EPIH ME | ASUKEN | MENI (De | escribe): | 102 | | |
| | · · · · · · · · · · · · · · · · · · · | · · · · · · · · · · · · · · · · · · · | | | · | | | |
| MONITORING | WELL CO | ONDITION | N: | | | | | |
| |] LOCKE | | | | | [X] UN | LOCKED | |
| | WELL NUN | _ | | • | | | | |
| | STEEL CAS | | | | | | | |
| | NNER PV | | | | | M MOTO | ADDADES | |
| | WATER DEFICE | | | | | | | NI . |
| | MONIT | | | | | | | |
| • ' | , , ,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,,, | Oldino . | | . Q 0 11 LD D | 100111111 | (40301100) | | |
| | | | | | | | | |
| | PRODUCT | | | | | | · · · · · · · · · · · · · · · · · · · | FT. BELOW DATUM |
| | WATER DI | | | ,997 | 70 | - 12.11 | | FT. BELOW DATUM |
| 4[] | WELL EVA | CUATIO | N:P | 1).11 | 0 | | | |
| | | | | talte | rump | | | |
| | | Observa | Removed | | ioheli va | ne) alaudu | • | |
| | | Observa | uons. | | ightly - ve
/el (rose - : | | | |
| | | | | Water od | | 1011 - 110 01 | iaige) |) |
| | | | | | | Blight y | ellowish | brown tint clean |
| 5[] | SAMPLE E | XTRACT | ION ME | | | - 0 / | | <u> </u> |
| | | | | | | | | |
| | | | ler made | | | | | |
| | | | np, type:_ | | | | | |
| 6 | ON-SITE M | | er, descri | | | | | |
| 6[] | JN-SITE M | IEASURE | | | RUMENT | PEADIN | ice | |
| Time | | 1509 | 1514 | ISIR | 1522 | 1526 | | Measured With |
| Temp (° | C) | 25.2 | 25,2 | 25.3 | 25.2 | 25.2 | | |
| pH | | 6.46. | 6.43 | 6.48 | 6.43 | 6.41 | | |
| Cond (µ | S/cm) | 401 | 383 | 379 | 368 | 367 | | |
| Do (mg/ | | 0,49 | 0.18 | 0.41 | 0.49 | 0,47 | | and the second s |
| Redox (1 | | 35 | 30 | 31 | 30 | 29 | | |
| gallons | ourged | Unitial | 1921 | 29a1 | 3gal | 4901 | | |
| | Comments | | J | - J | J | ' ' 3" | | |
| | | | | | | | | |
| | | | | | | | | |
| # f 3 | | ONTE : = : | rna (: | 1 | , | 2 - 4 | 9-1-11- | AL POTEN WIRE |
| 7[] | SAMPLE C | UNTAIN | EKS (mat | eriai, num | ioer, size): | <u> </u> | AWI NO | A'S (BTEX MIBE) |
| | | | | - | | | | |

Sampling Location AAFES, Marina, AOC-A, \$WMU 64, SWMU 64
Sampling Dates 6/22/99

| WATER DEPTH OTU: 5:20' TD: 12:20' FT. BELOW DATUM WELL EVACUATION: Method: Perestalia Pump Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: None Other comments: vellowisk clear SAMPLE EXTRACTION METHOD: [] Bailer made of: M Pump, type: [] Other, describe: ON-SITE MEASUREMENTS: DIRECT INSTRUMENT READINGS Time 142 148 142 1427 Measured With Temp (°C) 28.7 29.1 29.2 29.3 pH 5.79 5.92 5.95 5.95 Cond (µS/cm) 272 1-05 258 246 244 Do (mg/L) 0.25 0.08 0.07 0.08 Redox (mv) 69 65 65 64 4 gallons purged [n, 1/2] 1/32 29.4 39.4 Additional Comments: | ROUND WAT | ER SAMPLING R | ECORD - | MONITO | RING WE | LL Sh | /mu66- | -SW2 |
|--|--|---|-------------------|------------------|-----------------------|---------------------------------|---------------------------------------|--|
| NITORING WELL CONDITION: [] LOCKED: WELL NUMBER (IS SON) APPARENT STEEL CASING CONDITION IS: 400 WATER DEPTH MEASUREMENT DATUM (IS SOND) APPARENT [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe): PRODUCT DEPTH Apre FT. BELOW DATUM WATER DEPTH MOV: S. 20' TD: 12.20' FT. BELOW DATUM WATER DEPTH MOV: S. 20' TD: 12.20' FT. BELOW DATUM WELL EVACUATION: Method: Perstalar: Parp Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water volors: Parp Other comments: yellowish class [] SAMPLE EXTRACTION METHOD: [] Bailer made of: Water dors: Parp Other comments: yellowish class ON-SITE MEASUREMENTS: ON | DATE AND TIN
SAMPLE COLL
VEATHER: <u>5</u> (| IE OF SAMPLING
ECTED BY: 6 以6
Apay | 6:6/27
BF of P | 199
arsons ES | , 1999 | 1430 | | • |
| [] LOCKED: WELL NUMBER (IS NOW APPARENT STEEL CASING CONDITION IS: STEEL CASING CONDITION IS: INNER PVC CASING CONDITION IS: WATER DEPTH MEASUREMENT DATUM (IS NOW APPARENT [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe): PRODUCT DEPTH Mene FT. BELOW DATUM WATER DEPTH Mene FT. BELOW DATUM WELL EVACUATION: Wethod: Perstalri, Mane Volume Removed: Observations: Water (slightly - very) cloudy Water odors: None Other comments: yellewish describe: [] Bailer made of: | DATONITOR W | ATER DEF III M | EASURER | MENT (D | escribe) | 100 | | |
| [] LOCKED: WELL NUMBER (IS NOW APPARENT STEEL CASING CONDITION IS: STEEL CASING CONDITION IS: INNER PVC CASING CONDITION IS: WATER DEPTH MEASUREMENT DATUM (IS NOW APPARENT [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe): PRODUCT DEPTH Mene FT. BELOW DATUM WATER DEPTH Mene FT. BELOW DATUM WELL EVACUATION: Wethod: Perstalri, Mane Volume Removed: Observations: Water (slightly - very) cloudy Water odors: None Other comments: yellewish describe: [] Bailer made of: | AONITOPING | WELL CONDITION |)XI. | | | | | |
| WELL NUMBER (IS S NOT) APPARENT STEEL CASING CONDITION IS: 400 WATER DEPTH MEASUREMENT DATUM (IS SNOD) APPARENT [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe): PRODUCT DEPTH | | | /14. | | | DE TIN | II.OCKED | |
| STEEL CASING CONDITION IS: 400 INNER PVC CASING CONDITION IS: 400 WATER DEPTH MEASUREMENT DATUM (IS AND) APPARENT [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe): PRODUCT DEPTH Anne FT. BELOW DATUM WATER DEPTH OTU: 5.20' TD: 12.20' FT. BELOW DATUM WATER DEPTH OTU: 5.20' FT. BELOW DATUM WATER DATUM WATER DEPTH OTU: 5.20' FT. BELOW DATUM WATER DEPTH OTU: 5. | w | ELL NUMBER (I | S 4S NO | N APPAR | LENT | DA OI | | |
| WATER DEPTH MEASUREMENT DATUM (IS NOD) APPARENT [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe): PRODUCT DEPTH | S. | TEEL CASING CO | NDITION | IS: 40 | 19 will be strongware | hadamina, radin (indicate lass) | add) - 4 | and the second of the second o |
| [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe):] PRODUCT DEPTH | | | | | | | | |
| PRODUCT DEPTH None FT. BELOW DATUM | | | | | | | | NT |
| PRODUCT DEPTH None FT. BELOW DATUM WATER DEPTH OTU: 5.20' TD: 12.20' FT. BELOW DATUM WELL EVACUATION: Method: Perstalry Plane Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: None Other comments: yellowish dees SAMPLE EXTRACTION METHOD: Bailer made of: | • | • | | | | | | |
| WATER DEPTH OTU: 5:20' TD: 12.20' FT. BELOW DATUM WELL EVACUATION: Method: Perestals's Runo Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: None Other comments: vellowish clean SAMPLE EXTRACTION METHOD: [] Bailer made of: Pump, type: Other, describe: ON-SITE MEASUREMENTS: DIRECT INSTRUMENT READINGS Time | [| MONITORING | WELL RE | QUIRED | REPAIR | (describe) | | |
| WATER DEPTH OTU: 5:20' TD: 12.20' FT. BELOW DATUM WELL EVACUATION: Method: Perestals's Runo Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: None Other comments: vellowish clean SAMPLE EXTRACTION METHOD: [] Bailer made of: Pump, type: Other, describe: ON-SITE MEASUREMENTS: DIRECT INSTRUMENT READINGS Time | | | | | | | | |
| WATER DEPTH OTU: 5:20' TD: 12.20' FT. BELOW DATUM WELL EVACUATION: Method: Perestals's Runo Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: None Other comments: vellowish clean SAMPLE EXTRACTION METHOD: [] Bailer made of: Pump, type: Other, describe: ON-SITE MEASUREMENTS: DIRECT INSTRUMENT READINGS Time | 2 [] PI | RODUCT DEPTH | Done | | | | | FT. BELOW DATUM |
| WELL EVACUATION: Method: Perestals Parp Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: Oone Other comments: vellowish Clean SAMPLE EXTRACTION METHOD: Bailer made of: Pump, type: Other, describe: ON-SITE MEASUREMENTS: ON-SITE MEASUREMENTS: DIRECT INSTRUMENT READINGS Time | • • | | | .20' | TDI | 12.2 | 0' | ······································ |
| Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: | [] W | ELL EVACUATI | ON: | | | , | | |
| Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: | | Method | i: Per | staltic | Pum | 2 | | |
| Water level (rose - fell - no change) Water odors: | | Volum | e Removed | l: | Į. | | | |
| Water odors:Other comments: | | Observ | ations: | | | | | |
| Other comments: vellowish clear [] Bailer made of: [] Pump, type: [] Other, describe: [] ON-SITE MEASUREMENTS: DIRECT INSTRUMENT READINGS Time | | | | | | | nange) |) |
| SAMPLE EXTRACTION METHOD: Bailer made of: | | | | | | | | / |
| [] Bailer made of: | 5[] S. | AND E EVTDAC | TION ME | | mments: | CHOWIS | , cres | |
| Pump, type: | , [] | MIPLE EXTRAC | TION ME | INOD. | | | | |
| Pump, type: | • | [] Ba | iler made | of: | | | | |
| [] Other, describe: ON-SITE MEASUREMENTS: DIRECT INSTRUMENT READINGS Time | | • • | | | | | | |
| DIRECT INSTRUMENT READINGS Time | | | | | | | | |
| Time | [] 0 | N-SITE MEASUR | EMENTS: | | | | | |
| Temp (°C) | | | | | RUMENT | READIN | igs . | |
| pH 5.79: 5.93 5.95 5.95 Cond (μS/cm) 278 0.06 258 246 244 Do (mg/L) 0.25 0.08 0.07 0.08 Redox (mv) 69 65 65 64 gallons purged In; i: /ga 2ga 3ga Additional Comments: | | | | | 1/927 | | | Measured With |
| Cond (μS/cm) 278 0.06 258 246 244 Do (mg/L) 0.25 0.08 0.07 0.08 Redox (mv) 69 65 65 64 gallons purged Initial 19al 29al 39al Additional Comments: | |) 88.7 | 29,1 | 24.3 | 29,3 | | | |
| Do (mg/L) 0.25 0.08 0.07 0.08 Redox (mv) 69 65 65 64 gallons purged In; in 1921 2921 3921 Additional Comments: | | | | | | | | |
| Redox (mv) 69 65 65 64 gallons purged In; in 1 2gal 3gal Additional Comments: | Cond (µS | cm) 278 0-05 | | | | | <u> </u> | |
| gallons purged Initial Igal 2gal 3gal Additional Comments: | | | | | | | | |
| Additional Comments: | | | | | | | | |
| Additional Comments: | | | 1/301 | 1 Agal | 13941 | <u></u> | L | |
| SAMPLE CONTAINERS (material, number, size): 4-40ml VOA's (BTEX, MTBE, Meth | Additional | omments: | | · | | | · · · · · · · · · · · · · · · · · · · | |
| SAMPLE CONTAINERS (material, number, size): 4-40ml VOA's (BTEX, MTBE, Meth | | | | | | | | 7.111/10.00.00.00.00.00.00.00.00.00.00.00.00.0 |
| SAMPLE CONTAINERS (material, number, size): 4-40ml VOA's (BTEX, MTBE, Met. | | *************************************** | | | | | | |
| 1 January Manager Community of the Commu | 7[] S. | AMPLE CONTAIL | VERS (mat | erial num | nber, size) | 4-40 | m/ 1/0 | A's (BTEX MTRE Alex |
| | | | , | | | | | |

Sampling Location AAFES, Marina, AOC-A, SWMU 66, SWMU 64
Sampling Dates 6/02/99

| GROUND WATER SAM | PLING RE | CORD - | MONITO | RING WEL | L SW/ | 4466-SWZ |
|---|--|------------|------------------|-------------------|--|---|
| | | | | | | (number) |
| REASON FOR SAMPLIN
DATE AND TIME OF SA
SAMPLE COLLECTED I | MPLING: | <u> </u> | 199
arsons ES | , 1999 _ | <u>1500</u> a.m., | _ |
| WEATHER: | <u></u> | | (EXIT (D) | | 201- | |
| DATUM FOR WATER D | EPIH ME | ASUKEN | MENI (DO | escribe): | 106 | |
| | ······································ | | | | 700 | |
| MONITORING WELL C | ONDITION | ٧: | | | . / | |
| [] LOCK | ED: | | | | X UNLOCK | ED |
| WELL NU | | | | ENT | | |
| STEEL CA | | | | 302 | | |
| INNER PV | | | | | SNOT APPA | DENT |
| | | | | | OLLECTOR | |
| | | | | REPAIR (d | | |
| | | | | ` | | |
| | | -/ | | | | |
| 2[] PRODUCT | | None | <u></u> | | | FT. BELOW DATUM |
| WATER D 4 [] WELL EV | | 2.90 | יאון | 11.9 | | FT. BELOW DATUM |
| 4 [] WELL EV. | | | taltic | Pimo - | | |
| | | Remove | | · WINF | | |
| | Observa | | | ightly - very |) cloudy | |
| | | | | • | ll - no change) | <i>1</i> |
| | | | | ors: <u>none</u> | | |
| 6 () | | 10N1 N 65° | | mments: <u>ye</u> | Howish, Clea | 35 |
| 5[] SAMPLE | EXTRACT | ION ME | I HOD: | , | | |
| | [] Bai | ler made | of: | | | |
| | | np, type: | | | | |
| | 7 - | er, descri | | | | |
| 6[] ON-SITE! | MEASURE | | | | | |
| , | | | | | READINGS | |
| Time | 1443 | 144B | 1453 | 1457 | | Measured With |
| Temp (°C) | 26.3 | 26.3 | 26.3 | 26.2 | | 17 |
| pH | 6.09 | 6.09 | 6,13 | 6.10 | | SHoriba U-10 |
| Cond (µS/cm) | 434 | 428 | 416 | 414 | | |
| Do (mg/L) Redox (mv) | 0,36 | 60
60 | 0.02 | 50 | | VWR 3000 |
| gallons purged | 50 | | 5/ | | | VWK 3088 |
| Additional Comment | Initial | 19a1 | 12gal | 3gal | | |
| Additional Comment | | | | | ······································ | |
| | | | | | | |
| | | | | | 0 110 1 | Val. (of the most) |
| 7[] SAMPLE | CONTAIN | ERS (ma | terial, nun | nber, size):_ | 2-40ml | VOAS (BIEX, MIBE) |

Sampling Location Sampling Dates 6/22/99 AAFES, Marina, AOC-A, SWMU 66 SWMU 64

| OUND WATER SA | AMPLING KI | COKD - I | MONITO | KING WE | LL _2/ | 11.04 .71 | |
|---------------------------------|------------|---------------------------|-------------|--------------|--|---|--|
| | | | | | | | (number) |
| ASON FOR SAMP
TE AND TIME OF | | | | | | | • |
| MPLE COLLECTE | | | | , 1999 | 1030 | | |
| EATHER: 2/20 | \ | | | | | | |
| TUM FOR WATE | | EASUREM | IENT (De | escribe): | TOC | | |
| | | | · · | | | | |
| ONITORING WEL | CONDITIO | N: | | | | | |
| [] LO | CKED: | S | | | Ò{ ∩ | NLOCKED | |
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| | CASING CO | | | | | | |
| | R DEPTH ME | | | | - IS NOT | APPAREN | T |
| [] DE | FICIENCIES | CORREC | TED BY | SAMPLE | COLLEC | TOR | |
| [] MO | NITORING | WELL RE | QUIRED | REPAIR | (describe) |): | |
| | | | | | | | |
|] PRODI | JCT DEPTH | none | | ** | | | FT. BELOW DATUM |
| | R DEPTH | | .75" | TO: 1 | 3.1 | | FT. BELOW DATUM |
|] WELL | EVACUATIO | ON: | 6.10 | 0 | | | |
| | Method | Pere | Taltic | uni | <u> </u> | _ | |
| | Volume | Removed | - | lightly - ve | -v) aloud | | \ |
| | Observa | ations. | | vel (rose - | | | |
| | | | | lors: SIA | | | |
| * | | | Other cor | mments: | cllowis | 4-600WN | tiht, dear |
| SAMP | E EXTRAC | TION ME | | المرابع الم | | | |
| | | | | | | | |
| | | iler made | | | | | |
| | | mp, type:_
her, descri | | | | | |
| ON-SI | E MEASUR | • | | ***** | | | |
| • | | DIRI | ECT INST | TRUMEN | readii | NGS | |
| Time | 1612 | 1617 | 1(33 | 1629 | | | Measured With |
| Temp (°C) | 24.6 | 24.6 | 244 | 24.4 | ļ | | · · · · · · · · · · · · · · · · · · · |
| pH | 6.24 | 6.21 | 219 | 6.19 | | <u> </u> | |
| Cond (µS/cm) | 359 | 342 | 332 | 328 | - | | |
| Do (mg/L) | 0.31 | 0.10 | 204 | 003 | | | • |
| Redox (mv) | 31 | 30 | 31 | 35
3621 | | ++ | e e e e e e e e e e e e e e e e e e e |
| gallons purged Additional Comr | | <u>Il Igai</u> | 12ga) | 1 sgal | 1 | <u> </u> | |
| Additional Count | ,,,110, | | | | | | The contract of the contract o |
| | | | | | | | |
| | | | | | | | |

Sampling Location AAFES, Marina, AOC-A, SWMU 66, SWMU 64
Sampling Dates 0/2 / 9

| GROUND WATER SAMPLING RECORD - MONITORING WELL _ | (WMU66MW9-2 |
|--|-----------------|
| | (number) |
| REASON FOR SAMPLING: [X] Regular Sampling: [] Special Sam | ipling; |
| DATE AND TIME OF SAMPLING: 6/23/99, 1999 16
SAMPLE COLLECTED BY: 3 of Parsons ES | 600 a.m./p.m. |
| WEATHER: SUNNY 750 | |
| DATUM FOR WATER DEPTH MEASUREMENT (Describe): | |
| | 78C |
| VOLUMODDIO VIDILI CONDITIONI | |
| MONITORING WELL CONDITION: | ~
~UNLOCKED |
| [] LOCKED: WELL NUMBER (IS - (S NOT) APPARENT | ONLOCKED |
| STEEL CASING CONDITION IS: | Q_{ij} |
| INNER PVC CASING CONDITION IS: | 82 |
| WATER DEPTH MEASUREMENT DATUM (IS - IS N | |
| [] DEFICIENCIES CORRECTED BY SAMPLE COL | |
| [] MONITORING WELL REQUIRED REPAIR (desci | CAP C2" |
| | |
| 2 [] PRODUCT DEPTH | FT. BELOW DATUM |
| WATER DEPTH 5.997 TO 12.8 | FT. BELOW DATUM |
| 4[] WELL EVACUATION: Method: Partial tree | |
| Method: Volume Removed: | |
| Observations: Water (slightly -very cl | oudv |
| Water level (rose - fell - | no change) |
| Water odors: Suc | Tud 1 |
| Other comments: | Jehou/Blake |
| 5 [] SAMPLE EXTRACTION METHOD: | |
| Bailer made of: | |
| Pump, type: | |
| [] Other, describe: | |
| 6[] ON-SITE MEASUREMENTS: | |
| DIRECT INSTRUMENT REA | |
| | Measured With |
| Temp (°C) 282 28.0 27.9 27.9 pH 5.675.85 6.00 6.06 | HORING UIO |
| Cond (µS/cm) 381 464 526 546 | |
| Do (mg/L) 0.26 0.04 0.01 0.02 | |
| Redox (mv) +04.9-112.4-120.3 -120.6 | HANNA GOD |
| gallons purged O Igal Agal Agal | |
| Additional Comments: | |
| the state of the s | |
| | |
| 7 [] SAMPLE CONTAINERS (material, number, size): | 4 40 ml voos |
| BTEX MIBE, | MEDIANE |
| | |

Sampling Location AAFES, Marina, AOC-A, SWMU 66, SWMU 64
Sampling Dates 6/2199

| GROUND | WATER SAM | PLING RE | CORD - I | MONITOR | RING WE | LL SU | Mu66 | - MW9-6 |
|---------------|---------------|-----------|----------------------------------|---------------------------------------|-----------------|-------------------------|---------------------------------------|--|
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| REASON | FOR SAMPLIN | IG: [X] R | egular Şai | mpling; [| | | g; | |
| | D TIME OF SA | | | 2199 | , 1999 | 1600 | _ a.m_(p.m | |
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| MONITOR | UNG WELL C | ONDITION | ٧: | · · · · · · · · · · · · · · · · · · · | | | | |
| | []LOCK | | | _ | | NO DA | LOCKED | |
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| | STEEL CA | SING CO | NOITION | 15: <u>4000</u> | | | | |
| | WATER D | C CASING | Y CONDI | LION 12: | TIM (IS: | IS NOT) | APPAREN | NT |
| | [] DEFIC | | | | | | | • |
| | MONI | TORING V | VELL RE | OUIRED | REPAIR (| describe): | new / | sek cop |
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| 2[] | PRODUCT | | none | - | | | | FT. BELOW DATUM |
| 4.5.3 | WATER D | | | 65' | | TOIJ | 1.7. | FT. BELOW DATUM |
| 4[] | WELL EV | ACUATIO | Po~3 | taltie | R | | | |
| | | | Removed | | WIND. | | | |
| | • | Observa | | | ghtly - ver | y) cloudy | | |
| | | | | | el (rose - i | | |) |
| | | | | | ors: <u>non</u> | | | |
| | | | | | nments: | light y | ellows | h-brown fint, clear |
| 5[] | SAMPLE 1 | EXTRACT | ION MET | THOD: | | | | |
| | | f 1 D-! | 1 | - c | | | | |
| | | | ler made (
np, type: <u>4</u> | | | | | |
| | | | er, descri | | | | | |
| 6[] | ON-SITE | | • | | | | | |
| - () | | | | | RUMENT | READIN | GS | |
| Tin | ne | 141 | 1544 | 1548 | 1553 | | | Measured With |
| | np (°C) | 25.1 | 25.0 | | 92.1 | | | HORIRE U-10 |
| pН | | 6.15 . | 6.03 | 5.98 | 5.96 | | | |
| | nd (μS/cm) | 395 | 39 h | 380 | 367 | | | |
| | (mg/L) | 0.71 | 0:11 | 0-06 | 0.01 | | | 154 |
| | iox (mv) | 57 | 51 | 50 | 47 | | | Janu 3000 |
| | lons purged | En. Yial | <u> 1901 </u> | 125al | 1387 | L | <u> </u> | |
| Addi | tional Commen | ts: | | | | • | · · · · · · · · · · · · · · · · · · · | |
| | | | | | | | | |
| | | | | | | 41 | | |
| 7[] | SAMPLE | CONTAIN | ERS (mat | terial, num | ber, size): | 4-40 | ml VO | A'S (RIEX, MIBE Metha |
| | | | ` | • | | | | - |

Sampling Dates

Sampling Location AAFES, Marina, AOC-A/SWMU 66/SWMU 64

GROUND WATER SAMPLING RECORD - MONITORING WELL SWALL 66 1 REASON FOR SAMPLING: [X] Regular Sampling; [] Special Sampling; DATE AND TIME OF SAMPLING: 6/23/94 . 1999 1630 a.m./p.m. SAMPLE COLLECTED BY: R of Parsons ES WEATHER: DATUM FOR WATER DEPTH MEASUREMENT (Describe): MONITORING WELL CONDITION: [] LOCKED: UNLOCKED WELL NUMBER (IS - IS NOT) APPARENT. STEEL CASING CONDITION IS: INNER PVC CASING CONDITION IS: WATER DEPTH MEASUREMENT DATUM(IS) IS NOT) APPARENT [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR [] MONITORING WELL REQUIRED REPAIR (describe): 2[] PRODUCT DEPTH / D FT. BELOW DATUM WATER DEPTH FT. BELOW DATUM 4[] WELL EVACUATION: Method: Volume Removed: Observations: Water (slightly - very) cloudy Water level (rose - fell - no change) Water odors: Surrun Other comments: YELECUI 5[] SAMPLE EXTRACTION METHOD: [] Bailer made of: [\]\_Pump, type:\_\_ [] Other, describe: 6[] **ON-SITE MEASUREMENTS: DIRECT INSTRUMENT READINGS** Time Measured With Temp (°C) HMIBEZ pΗ 00 00 6.0 Cond (µS/cm) Do (mg/L) Redox (mv) 72,5 HANNIA 90 gallons purged Additional Comments: 7[] SAMPLE CONTAINERS (material, number, size)

L:\forms\gwsample.doc

Sampling Dates

Sampling Location AAFES, Marina, AOC-A, SWMU 66, SWMU 64

0/23

GROUND WATER SAMPLING RECORD - MONITORING WELL SWALL 66 MU (number) REASON FOR SAMPLING: [X] Regular Sampling; [] Special Sampling; DATE AND TIME OF SAMPLING: 6/23/99 1999 1530 , 1999 153 Da.m./p.m. SAMPLE COLLECTED BY: of Parsons ES SUNNY WEATHER: DATUM FOR WATER DEPTH MEASUREMENT (Describe): MONITORING WELL CONDITION: **MUNLOCKED** [] LOCKED: WELL NUMBER (IS IS NOT) APPARENT STEEL CASING CONDITION IS: .6000 INNER PVC CASING CONDITION IS: WATER DEPTH MEASUREMENT DATUM (IS - IS NOLD APPARENT [] DEFICIENCIES CORRECTED BY SAMPLE COLLECTOR MONITORING WELL REQUIRED REPAIR (describe):\_ NO 2[] PRODUCT DEPTH FT. BELOW DATUM FT. BELOW DATUM WATER DEPTH WELL EVACUATION: 4[] ENISTA Method: Volume Removed: Water (slightly - very) cloudy Observations: Water level (rose fell no change) SULFUL Water odors: Other comments: 402LDW3 5[] SAMPLE EXTRACTION METHOD: [] Bailer made of: Pump, type: [] Other, describe: **ON-SITE MEASUREMENTS:** 6[] DIRECT INSTRUMENT READINGS Measured With Time Temp (°C) Cond (µS/cm) 31 Do (mg/L) Redox (mv) MANNA gallons purged Additional Comments: SAMPLE CONTAINERS (material, number, size): 7[]

Keesler AFB

SWMU 66 AOC-A AAFES **MARINA**

SAMPLE DATE

TIME SAMPLED

SAMPLE I.D.

3WM1166-MW9-

TIME ANALYSIS START TIME ANALYSIS END

FILTERED (circle)

NO

COLOR / ODOR:

yellow/sulfur

HACH DR/700 Measurements:

| Analyte | Program | Range | Dilution | Reading | Concentration | ı | Blank <sup>a/,b/</sup> |
|---------|---------|---------------|----------|---------|---------------|------|------------------------|
| Ferrous | 50.01.1 | 0 - 5.10 mg/L | | 0.06 | 0,06 | mg/L | sample |
| | | | | | | mg/L | sample |
| Sulfate | 45.000 | 0 - 100 mg/L | | 0.93 | 0,93 | mg/L | DI or 50mg/L |
| | | | | | | mg/L | DI or 50mg/L |

CHEMetrics Color Tests:

Ammonia

ppm

BKB Technician:

Ferrous iron blanks should be diluted accordingly if samples are diluted.

Sometimes of the following size false readings

Sulfate w/o reagent: 3.69 mg/1 W/ reagent: 3.62 ng/1

<sup>&</sup>quot;sulfate blanks contain respective reagents; Ferrous iron blanks are without reagents.

Keesler AFB

SWMU 66 AOC-A AAFES **MARINA**

SAMPLE DATE

TIME SAMPLED

SAMPLE I.D.

SWMU66-MW9-2

TIME ANALYSIS START TIME ANALYSIS END

FILTERED (circle)

NO

COLOR/ODOR: yellowish/sulfur

HACH DR/700 Measurements:

| Analyte | Program | Range | Dilution | Reading | Concentrat | ion | Blank <sup>a/,b/</sup> |
|---------|---------|---------------|----------|---------|------------|------|------------------------|
| Ferrous | 50.01.1 | 0 - 5.10 mg/L | | 0.22 | 0.22 | mg/L | sample |
| | | | - | | | mg/L | sample |
| Sulfate | 45.000 | 0 - 100 mg/L | | 16.83 | 15.83 | mg/L | DI or 50mg/L |
| | | | | | | mg/L | DI or 50mg/L |

CHEMetrics Color Tests:

Ammonia

6.0 ppm (A)

Technician:

BKB

@ initial yellowish tint could give talse results

Sulfate: W/O reagent: 7,97 mg/L

W/reagent: 23.80 mg/L

<sup>&</sup>quot;sulfate blanks contain respective reagents; Ferrous iron blanks are without reagents.

b' Ferrous iron blanks should be diluted accordingly if samples are diluted.

Keesler AFB

SWMU 66 AOC-A AAFES **MARINA**

SAMPLE DATE

TIME SAMPLED

SAMPLE I.D.

5wmu66-mw9-6

TIME ANALYSIS START TIME ANALYSIS END

FILTERED (circle)

(YES)

NO

COLOR / ODOR:

des yellowish tint/sylen

HACH DR/700 Measurements:

| Analyte | Program | Range | Dilution | Reading | Concentration | | Blank <sup>a/,b/</sup> |
|---------|---------|----------------|----------|---------|---------------|------|------------------------|
| Ferrous | 50.01.1 | 0 - 5.10 mg/L | ĺ | 0.19 | 0,19 | mg/L | sample |
| | * | and the second | | | | mg/L | sample |
| Sulfate | 45.000 | 0 - 100 mg/L | 1 | 0.59 | 0,59 | mg/L | DI or 50mg/L |
| | | | | | | mg/L | DI or 50mg/L |

CHEMetrics Color Tests:

Ammonia

3.0 ppm

BKB Technician:

of Yellow color may give false high realings

Sulfate W/o reagent: 3.08 mg/l
W/reagent: 3.67

<sup>&</sup>quot;sulfate blanks contain respective reagents; Ferrous iron blanks are without reagents.

b' Ferrous iron blanks should be diluted accordingly if samples are diluted.

Keesler AFB

SWMU 66 AOC-A AAFES MARINA

| SAMPLE DATE | 6/23/99 | TIME SAMPLED TIME ANALYSIS START | 1630 |
|-------------------|--------------------|----------------------------------|------|
| SAMPLE I.D. | 5wmu66-mw9-7 | TIME ANALYSIS END | 1705 |
| FILTERED (circle) | YES NO | • | |
| COLOR/ODOR: | yellow/hydrocarbon | • | |

HACH DR/700 Measurements:

| Analyte | Program | Range | Dilution | Reading | Concentration | <u> </u> | Blank <sup>a/,b/</sup> |
|---------|---------|---------------|----------|---------|---------------|----------|------------------------|
| Ferrous | 50.01.1 | 0 - 5.10 mg/L | | 25,10 | | mg/L | sample |
| | | | 5 | 0.95 | 4.75 | mg/L | sample |
| Sulfate | 45.000 | 0 - 100 mg/L | | -5.820 | 5820 | mg/L | DI or 50mg/L |
| | | | | | | mg/L | DI or 50mg/L |
| | | | | | | | |

| CHEMetrics Color Tests: Ammonia | • | Ø.∂ ppm |
|---------------------------------|-----|--|
| Technician: | BKB | and the same of th |

@ intial yellow fint may cause Ealse readings

Sweate w/o reagent: 6.55 mg/L W/reagent: 5,82 mg/L

<sup>&</sup>quot;sulfate blanks contain respective reagents; Ferrous iron blanks are without reagents.

by Ferrous iron blanks should be diluted accordingly if samples are diluted.

ON-SITE MEASUREMENTS HACH AND CHEMetrics ANALYSES

Keesler AFB

SWMU 66) AOC-A AAFES **MARINA**

| SAMPLE | DATE |
|--------|------|
|--------|------|

123149

TIME SAMPLED

SAMPLE I.D.

5WMU66-MW9-8

TIME ANALYSIS START TIME ANALYSIS END

FILTERED (circle)

(YÉS

NO

yellowish / Hydrocorbon - sulfur

HACH DR/700 Measurements:

| Analyte | Program | Range | Dilution | Reading | Concentration | Blank <sup>a/,b/</sup> |
|---------|---------|---------------|----------|---------|---------------|------------------------|
| Ferrous | 50.01.1 | 0 - 5.10 mg/L | | 0.92 | 0,98 1 | ng/L sample |
| | | | | | | ng/L sample |
| Sulfate | 45.000 | 0 - 100 mg/L | | 0.39 | 0.39 i | ng/L DI or 50mg/L |
| | | | | | 1 | ng/L DI or 50mg/L |

CHEMetrics Color Tests:

Ammonia

10.0 ppm con't perconn."

Technician:

BKB

<sup>a'</sup> sulfate blanks contain respective reagents; Ferrous iron blanks are without reagents.

b' Ferrous iron blanks should be diluted accordingly if samples are diluted.

@ initial yellowness could cause a Folse reading

Sulfate: W/o reagent: 5.23 W/reagent: 5.62

APPENDIX C
CONTAMINANT ATTENUATION ASSESSMENT

APPENDIX C CONTAMINANT ATTENUATION ASSESSMENT SWMU 66

C.1 INTRODUCTION

Biodegradation of dissolved fuel constituents is assessed in this section to support selection of a long term management (LTM) approach for sites at SWMU 66. As used throughout this report, the term "remediation by natural attenuation" (RNA) refers to a subsurface contaminant management strategy that relies on natural physical, chemical, and biological mechanisms to control exposure of potential receptors to concentrations of contaminants in soil and groundwater that exceed regulatory levels. These mechanisms include the processes of hydrodynamic dispersion, dilution, sorption, volatilization, and biodegradation, which facilitate RNA of a variety of anthropogenic chemicals.

This section summarizes and interprets specific site characterization data relevant to documenting the effectiveness of RNA by:

- 1. Discussing different attenuation mechanisms (Section C.2);
- 2. Assessing evidence of contaminant attenuation over time (Section C.3); and
- 3. Analyzing geochemical data collected during the June 1999 field effort (Sections C.4 and C.5)

C.2 OPERATIVE MECHANISMS OF CONTAMINANT ATTENUATION

Understanding the fate of fuel hydrocarbons in environmental media is critical to evaluating and predicting contaminant distribution patterns. There are several physical, chemical, and biological processes that influence how a chemical behaves in soil and groundwater.

Nondestructive attenuation processes can be described as those physical and chemical processes that may prohibit significant contaminant migration but will not result in a permanent reduction in contaminant mass. Examples of nondestructive attenuation processes include volatilization, sorption, dilution, and hydrodynamic dispersion. These processes must be evaluated when determining whether some type of remediation is warranted because chemical contamination poses or has the potential to pose a risk to human or ecological receptors. If contamination cannot reach a potential receptor exposure point, the contamination poses no risk.

In comparison to nondestructive chemical attenuation processes, destructive chemical attenuation processes result in the permanent removal of contaminant mass from the environment. Documenting and distinguishing the effects of destructive attenuation processes, such as biodegradation, from nondestructive attenuation processes is critical to evaluating the potential for RNA to bring about a reduction in contaminant mass over time. The effectiveness of destructive attenuation processes at reducing contaminant mass at a site depends on how susceptible the chemical is to biodegradation and whether the site is characterized by physical, chemical, and biological conditions favorable to such processes.

C.3 EVIDENCE OF CONTAMINANT BIODEGRADATION OVER TIME

The first step in determining whether fuel hydrocarbon constituents are biodegrading in groundwater at SWMU 66 was to compare contaminant concentrations at selected sampling locations over time. The purpose of this comparison was to assess the evidence of field-scale contaminant mass loss. Decreases in the magnitude of contaminant concentrations at a site over time that cannot be explained by physical processes (e.g., source removal, mass transport in groundwater) may be the first indication that contaminants are biodegrading at the site.

Hydrocarbon concentrations were measured at SWMU 66 from six monitoring wells in May 1998, August 1998, and November 1998, and from eight monitoring wells in June 1999. The data from these sampling events are summarized in Table C.1. Three of the eight monitoring wells had measurable concentrations of total BTEX in June 1999; the BTEX concentrations increased in all three wells since the May 1998 sampling event and can be attributed to the mass transport of the plume in the groundwater. Monitoring well MW9-6 was the only well to have total BTEX concentrations decrease (207.9 μ g/L to non detect) since the 1998 sampling event.

Decreasing dissolved hydrocarbon concentrations indicate that the mass of hydrocarbons input into the groundwater system in the source area (through leaching of residual hydrocarbons in soils) is decreasing, and that biodegradation of dissolved BTEX is occurring.

C.4 EVIDENCE OF CONTAMINANT BIODEGRADATION VIA MICROBIALLY MEDIATED REDOX REACTIONS

Groundwater geochemical data also can be used to show that fuel hydrocarbons are biodegrading in saturated soil and groundwater at SWMU 66. Fuel hydrocarbon constituents are typically utilized as electron donors in biologically mediated redox reactions under a wide range of geochemical conditions. Therefore, analytical data on potential electron acceptors can be used as geochemical indicators of fuel hydrocarbon biodegradation (Wiedemeier et al., 1995). Reductions in the concentrations of oxidized chemical species

that are used by microorganisms to facilitate the oxidation of fuel hydrocarbon compounds within contaminated media are an indication that contaminants are biodegrading. Alternately, an increase in the metabolic byproducts resulting from the reduction of electron acceptors can be used as an indicator of contaminant biodegradation. The availability of potential electron acceptors to participate in contaminant biodegradation reactions can be used to estimate the total contaminant mass that can be biodegraded over time at this site. Coupled with calculated biodegradation rates, this information can be used to predict how much and how quickly fuel hydrocarbons can be removed from saturated soils and groundwater at SWMU 66 as a result of natural processes only.

C.4.1 Relevance of Redox Couples in Biodegradation

Microorganisms obtain energy to replenish enzymatic systems and to reproduce by oxidizing organic matter. Biodegradation of dissolved hydrocarbons is the result of a series of redox reactions that maintain the charge balance within the natural environment. Microorganisms facilitate the degradation of these organic compounds by transferring electrons from the electron donor (i.e., fuel hydrocarbons and native organic carbon) to available electron acceptors. Electron acceptors are elements or compounds that occur in relatively oxidized states and can participate in redox reactions involving these available electron donors. Electron acceptors known to be present in saturated soil and groundwater at SWMU 66 are oxygen, nitrate/nitrogen, sulfate, ferric iron (Fe<sup>3+</sup>), and carbon dioxide.

Microorganisms facilitate fuel hydrocarbon biodegradation to produce energy for their use. The amount of energy that can be released when a reaction occurs or is required to drive the reaction to completion is quantified by the free energy of the reaction (Stumm and Morgan, 1981). Microorganisms are able to utilize electron transport systems and chemiosmosis to combine energetically favorable and unfavorable reactions to produce energy for life processes (i.e., cell production and maintenance). Microorganisms will facilitate only those redox reactions that will yield energy. By coupling the oxidation of fuel hydrocarbon compounds, which requires energy, to the reduction of other compounds (e.g., oxygen, nitrate/nitrite, manganese, ferric iron, sulfate, and carbon dioxide), which yields energy, the overall reaction will yield energy. Detailed information on the redox reactions required to biodegrade dissolved fuel hydrocarbons is included in Table C.2. The reader is encouraged to review this information to more fully understand the chemical basis of biodegradation.

Figure C.1 illustrates the sequence of microbially mediated redox processes based on the amount of free energy released for microbial use. In general, reactions yielding more energy tend to take precedence over processes that yield less energy (Stumm and Morgan, 1981). As Figure C.1 shows, oxygen reduction would be expected to occur in an aerobic environment with microorganisms capable of aerobic respiration because oxygen reduction yields significant energy. However, once the available oxygen is depleted and anaerobic conditions dominate the interior regions of the contaminant plume, anaerobic

microorganisms can utilize other electron acceptors in the following order of preference: nitrate/nitrite, manganese, ferric iron, sulfate, carbon dioxide, and nitrogen. Each successive redox reaction provides less energy to the system, and each step down in redox energy yield would have to be paralleled by an ecological succession of microorganisms capable of facilitating the pertinent redox reactions.

The expected sequence of redox processes can be estimated by the oxidation-reduction potential (ORP) of the groundwater. The ORP measures the relative tendency of a solution or chemical reaction to accept or transfer electrons, and can be measured in the field. This measurement can be used as a crude indicator of which redox reactions may be operating at a site. High ORPs mean that the solution (or available redox couple) has a relatively high oxidizing potential.

Microorganisms can only facilitate the biodegradation (oxidation) of the fuel hydrocarbon compounds using redox couples that have a higher ORP than the contaminants. This is why these electron acceptors can be used to oxidize the fuel hydrocarbon compounds. The reduction of highly oxidized species results in an overall decrease in the oxidizing potential of the groundwater. As shown in Figure C.1, the reduction of oxygen and nitrate will reduce the oxidizing potential to levels at which ferric iron reduction can occur. As each chemical species that can be used to oxidize the contaminants is exhausted, the microorganisms are forced to use other available electron acceptors with lower oxidizing capacity. When sufficiently low (negative) ORP levels have developed as a result of these redox reactions, sulfate reduction, methanogenesis, and nitrogen fixation can occur almost simultaneously (Stumm and Morgan, 1981).

ORP values measured in shallow groundwater at SWMU 66 in June 1999 ranged from -75.0 to -120.6 millivolts (mV) (Table C.3, Figure C.2). Because of a faulty ORP meter, this range includes only three of the eight monitoring wells sampled. The negative ORP results indicate that the progressive use of electron acceptors in the order shown on Figure C.1 has caused the groundwater in the proximity of the contaminated area to become more reducing. These data imply that oxygen, nitrate, manganese, and ferric iron may be used to biodegrade fuel hydrocarbon contaminants at this site. However, many authors have noted that field ORP data alone cannot be used to reliably predict all of the electron acceptors that may be operating at a site, because the platinum electrode probes of ORP meters are not sensitive to some redox couples (e.g., sulfate/sulfide) (Stumm and Morgan, 1981; Godsy, 1994; Lovley et al., 1994). Analytical data on oxidized and reduced species are presented in the following subsections to verify which electron acceptors are actually being used to biodegrade the hydrocarbon fuel hydrocarbons in saturated soil and groundwater at SWMU 66.

Throughout the following subsections, the distributions of geochemical parameters are examined by comparing background concentrations to fuel hydrocarbon plume core concentrations. Analytical data from upgradient well MW9-2 is used for background

concentrations. Analytical data from MW9-7R, and MW9-8 are used for fuel hydrocarbon plume core concentrations. Hydrocarbon concentrations are presented on Figure 2.8. The following shows qualitatively the expected geochemical parameter response to biodegradation of BTEX compounds, with \(\begin{align\*}\) referring to relatively high concentrations and \(\psi\) referring to relatively low concentrations (Payne, et al. 1995):

BTEX
$$\uparrow$$
: $O_2 \downarrow NO^{3-} \downarrow NH_3 \uparrow Fe^{2+} \uparrow SO^4 \downarrow H_2S \uparrow CH_4 \uparrow$
BTEX \downarrow : $O_2 \uparrow NO^{3-} \uparrow NH_3 \downarrow Fe^{2+} \downarrow SO^4 \uparrow H_2S \downarrow CH_4 \downarrow$

C.4.2 Dissolved Oxygen (O<sub>2</sub>)

Almost all types of fuel hydrocarbons can be biodegraded under aerobic conditions (Borden, 1994). Mineralization of fuel hydrocarbons to carbon dioxide and water under aerobic conditions involves the use of oxygen as a cosubstrate during the initial stages of metabolism, and as a terminal electron acceptor during the later stages of metabolism for energy production. The reduction of molecular oxygen during the oxidation of the fuel hydrocarbon compounds yields a significant amount of free energy that the microorganisms can utilize.

DO concentrations were measured at groundwater sampling locations in June 1999. Table C.3 presents the analytical results for DO by sampling location. As shown on the table, DO concentrations range from 0.01 to 0.47 mg/L. The overall low magnitude of DO concentrations indicates that oxygen is not currently a significant electron acceptor during microbially mediated degradation of fuel hydrocarbons at SWMU 66.

C.4.3 Ammonia (NH<sub>3</sub>)

The presence of ammonia in groundwater can result from either nitrate reduction (facilitated by microbes) or fixing of atmospheric nitrogen (also a microbial process). From previous sampling events at SMWU 66 and other Keesler AFB sites, it is known that nitrate is not widespread in groundwater within the surficial aquifer; however, the fixation of atmospheric nitrogen may occur under the anaerobic, methanogenic conditions observed at the site. The presence of ammonia in groundwater is a strong indication of microbial activity.

Ammonia (as N) concentrations measured in groundwater samples collected in June 1999 are summarized in Table C.3, and presented on Figure C.3. The natural yellow color of the groundwater at SWMU 66 may have falsely elevated the detected ammonia concentrations. However, the relative difference between upgradient and plume core wells should still be valid. The background ammonia concentration measured in well MW9-2 was 6 mg/L (Figure C.3). In contrast, the ferrous iron concentrations detected in the plume core wells exhibiting the highest contaminant concentrations were 8 mg/L (MW9-7R) and 10 mg/L (MW9-8). Ammonia concentrations detected in shallow groundwater varied across the site, with elevated ammonia concentrations occurring in the

fuel hydrocarbon plume core area. Therefore, production of ammonia appears to be occurring due to increased microbial activity stimulated by the relative abundance of organic carbon (fuel hydrocarbons).

The measured ORPs of the groundwater at this site are not within the range that would be expected for the ammonia-producing conditions implied by the observed ammonia distribution. However, as described in Section C.4.1, field ORP data alone cannot be used to reliably predict the electron acceptors that may be operating at a site.

C.4.4 Ferrous Iron (Fe<sup>2+</sup>)

Although relatively little is known about the anaerobic metabolic pathways involving the reduction of ferric iron (Fe<sup>3+</sup>), this process has been shown to be a major metabolic pathway for some microorganisms (Lovley and Phillips, 1988; Chapelle, 1993). Elevated concentrations of ferrous iron (Fe<sup>2+</sup>) often are found in anaerobic, fuel-contaminated groundwater systems. Concentrations of dissolved ferrous iron once were attributed to the spontaneous and reversible reduction of ferric oxyhydroxides, which are thermodynamically unstable in the presence of organic compounds such as benzene. However, more recent studies suggest that the reduction of ferric iron cannot proceed at all without microbial mediation (Lovley and Phillips, 1988; Lovley et al., 1991; Chapelle, 1993). None of the common organic compounds found in low-temperature, neutral, reducing groundwater could reduce ferric oxyhydroxides to ferrous iron under sterile laboratory conditions (Lovley et al., 1991). This means the reduction of ferric iron to ferrous iron requires mediation by microorganisms with the appropriate enzymatic capabilities.

To determine if ferric iron is being used as an electron acceptor for fuel biodegradation at SWMU 66, ferrous (reduced) iron concentrations were measured at groundwater sampling locations in June 1999 (Table C.3). The background ferrous iron concentration measured in well MW9-2 was 0.22 mg/L (Figure C.4). In contrast, the ferrous iron concentrations detected in the plume core wells exhibiting the highest contaminant concentrations were 4.75 mg/L (MW9-7R) and 0.92 (MW9-8). The occurrence of elevated ferrous iron concentrations within contaminated areas indicates that ferric iron is acting as an electron acceptor at these locations.

C.4.5 Sulfate (SO<sup>4</sup>)

Sulfate also may be used as an electron acceptor during microbial degradation of fuel hydrocarbons under anaerobic conditions (Grbic'-Galic', 1990). Sulfate can be reduced to sulfide (H<sub>2</sub>S) during the oxidation of the fuel hydrocarbon compounds. The presence of decreased concentrations of sulfate (and increased concentrations of sulfide) in the source area relative to background concentrations indicates that sulfate is participating in redox reactions at the site. To investigate the potential for sulfate reduction at SWMU 66, sulfate concentrations were measured during the June 1999 groundwater sampling event.

Table C.3 and Figure C.5 show the analytical results for sulfate in groundwater at SWMU 66. The background sulfate concentration measured in well MW9-2 was 15.83 mg/L. In contrast, the ferrous iron concentrations detected in the plume core wells exhibited the lowest contaminant concentrations of non-detect (MW9-7R) and 0.39 mg/L (MW9-8). In general, there is a good correlation between areas of depleted sulfate concentrations and the plume core. The decrease of sulfate within the contaminated area indicates microbial populations are using sulfate to oxidize fuel hydrocarbons at the site.

C.4.6 Dissolved Methane (CH<sub>4</sub>)

The carbon dioxide/methane (CO<sub>2</sub>/CH<sub>4</sub>) redox couple also could be used to oxidize fuel hydrocarbon compounds to carbon dioxide and water once the groundwater is sufficiently reducing. To attain these reducing levels, other highly oxidizing chemical species such as oxygen, nitrate, ferric iron, and sulfate must first be reduced. This redox reaction is called methanogenesis or methane fermentation. Methanogenesis yields the least free energy to the system in comparison to other chemical species (Figure C.1). The presence of methane in groundwater at elevated concentrations relative to background concentrations is a good indicator of methane fermentation.

Dissolved methane was measured at groundwater monitoring wells sampled during the June 1999 sampling event. Tables C.3 and Figure C.6 presents the analytical data for methane. Methane concentrations detected in the contaminant source areas were elevated relative to background concentrations. Methane concentrations measured at plume core area wells were 4.84 mg/L (MW9-7R) to 2.63 mg/L (MW9-8). In contrast, the background concentration at monitoring well MW9-2 was 1.44 mg/L. The presence of elevated methane levels in groundwater at SWMU 66 strongly indicates biodegradation is occurring via methanogenesis.

The measured ORPs of the groundwater at this site are not within the range that would be expected for the methanogenic conditions implied by the observed methane distributions. However, as described in Section C.4.1, field ORP data alone cannot be used to reliably predict the electron acceptors that may be operating at a site.

C.4.7 pH

The pH of groundwater samples collected from groundwater monitoring wells in June 1999 was measured (Table C.3). The pH of a solution is the negative logarithm of the hydrogen ion concentration [H<sup>+</sup>]. Groundwater pH values measured at the site ranged from 5.26 to 6.41 standard units (SU) with an average of 6.00 SU. This average pH is within the optimal range for fuel hydrocarbon-degrading microbes of 6 to 8 SU. The presence of acidic pH values indicates groundwater alkalinity may be sufficient to fully buffer the groundwater pH against the organic acids produced during microbial reactions.

C.5 THEORETICAL ASSIMILATIVE CAPACITY ESTIMATES

The preceding discussions have been devoted to determining if fuel hydrocarbons are biodegrading in saturated soils and groundwater at SWMU 66. Analytical data on reduced and oxidized chemical species indicate indigenous microorganisms are facilitating the oxidation of fuel hydrocarbons and the reduction of electron acceptors to generate free energy for cell maintenance and production. The question of how much contaminant mass can be biodegraded must be addressed to assess the full potential for long-term intrinsic bioremediation to minimize plume size and mass over time.

Mass balance relationships can be used to determine how much contaminant mass can be degraded by each of the redox reactions that the microorganisms might use to make free energy available for cell maintenance and production. The stoichiometric relationship between the contaminant and the electron acceptor can be used to estimate the expressed assimilative capacity of the groundwater. Once the redox reactions operating at the site have been defined, it is possible to estimate how much contaminant mass can be assimilated or oxidized by available electron acceptors.

Table C.2 presents the coupled redox reactions that represent the biodegradation of the individual fuel hydrocarbons, including the stoichiometric mass ratio of electron acceptors needed to oxidize each compound. These stoichiometric mass ratios can be used to estimate the assimilative capacity of the groundwater at SWMU 66. For oxygen, nitrate, and sulfate (which are electron acceptors), this is accomplished by first determining the initial (background) mass of each electron acceptor available in the groundwater. Data on these chemical species were collected at sampling locations upgradient from the dissolved plume. As groundwater slowly migrates into the source area, electron acceptors are brought into contact with hydrocarbon-degrading microorganisms and site contamination. The change in the electron acceptor mass from background sampling locations to sampling locations within the plume core is divided by the mass ratio from Table C.2.

For nitrogen fixation, ferric iron reduction, and methanogenesis, the electron acceptor is not measured. Instead, the metabolic byproducts (ammonia, ferrous iron, and methane) are measured. The highest observed concentration of the metabolic byproduct in the plume core wells is divided by the mass ratio from Table C.2. These numbers are summed to estimate the expressed intrinsic capacity of the groundwater to biodegrade fuel hydrocarbons (Table C.4).

On the basis of these calculations, one pore volume of saturated soil and groundwater at SWMU 66 has the capacity to oxidize an average BTEX concentration of approximately 11.96 mg/L (11,960 μ g/L) (Table C.4). The maximum BTEX concentration at SWMU 66 in June 1999 was 0.49 mg/L (489.7 μ g/L).

This estimate essentially represents an estimate of the fuel hydrocarbon reduction capability of one pore volume of groundwater at SWMU 66. The estimate identifies how much contaminant mass can be theoretically oxidized as one pore volume travels through the plume core. In reality, one pore volume is expected to move through the contaminated aquifer material in the source area every 7.1 years based on the estimated groundwater velocity of 45 ft/yr and a source area length of approximately 320 feet.

A closed system containing 2 liters of water can be used to help visualize the physical meaning of assimilative capacity. Assume that the first liter contains no fuel hydrocarbons, but it contains fuel-degrading microorganisms and has an assimilative capacity of exactly "x" mg of fuel hydrocarbons. The second liter has no assimilative capacity; however, it contains fuel hydrocarbons. As long as these 2 liters of water are kept separate, biodegradation of fuel hydrocarbons will not occur. If these 2 liters are combined in a closed system, biodegradation will commence and continue until the fuel hydrocarbons or electron acceptors are depleted. If less than "x" mg of fuel hydrocarbons are in the second liter, all of the fuel hydrocarbons will eventually degrade given a sufficient time; likewise, if greater than "x" mg of fuel hydrocarbons were in the second liter of water, only "x" mg of fuel hydrocarbons would ultimately degrade.

This example shows that in a closed system, the measured expressed assimilative capacity eventually should be equivalent to the loss in contaminant mass; however, the groundwater beneath the site is an open system. Electron acceptors can continually enter the system from upgradient flow. Furthermore, contaminant mass can be added to the system through dissolution or leaching from contaminated soils. This means that the assimilative capacity is not fixed as it would be in a closed system, and therefore should not be quantitatively compared to concentrations of dissolved contaminants in the groundwater. Rather, the expressed assimilative capacity of groundwater is intended to serve as a qualitative tool. The fate of fuel hydrocarbons in groundwater is dependent on the relationship between the kinetics of biodegradation and the solute transport velocities (Chapelle, 1994).

C.6 SUMMARY OF FINDINGS

The results of chemical fate assessment performed in this section are as follows:

- 1. Historical groundwater analytical data indicate BTEX concentrations in most wells since May 1998 are increasing over time;
- Geochemical data strongly indicate that biodegradation of fuel hydrocarbons is occurring primarily through the processes of iron reduction, sulfate reduction, nitrogen fixation and methanogenesis; and
- 3. The expressed BTEX assimilative capacity of the aquifer (11.96 mg/L) is more than the maximum BTEX concentration detected in SWMU 66 groundwater (0.49 mg/L).

ORP (mV) **ORP** -1000-500 0 +500 +1000 Higher O, Reduction Denitrification Fe<sup>3+</sup> Relative Energy Yield for Redox Sulfate Reduction Reaction Methanogenesis Nitrogen Fixation Lower

Notes

ORP = Oxidation Reduction Potential

Range of ORP measured at SWMU 66

- 1. These reactions would be expected to occur in sequence if the system is moving toward equilibrium.
- 2. These redox processes occur in order of their energy-yielding potential (provided microorganisms are available to mediate a specific reaction). Reduction of a highly oxidized species decreases the ORP of the system.
- 3. The ORP of the system determines which electron acceptors are available for organic carbon oxidation.
- 4. Redox reaction sequence is paralleled by an ecological succession of biological mediators.

FIGURE C.1

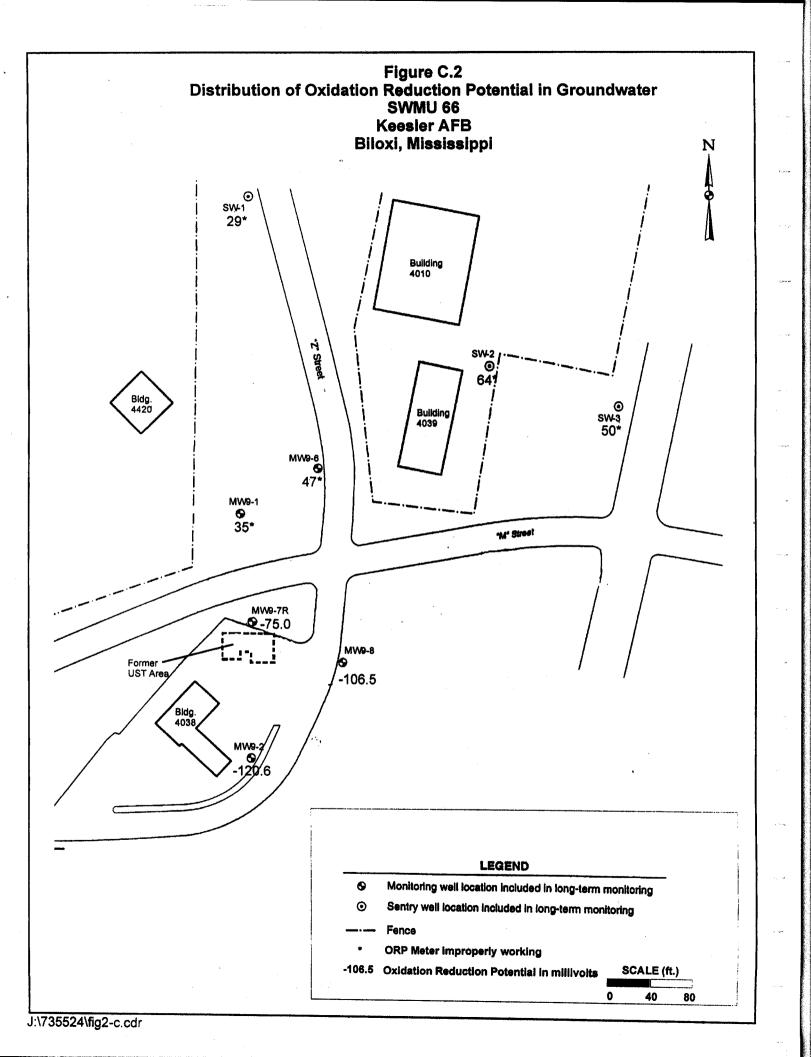
SEQUENCE OF MICROBIALLY MEDIATED REDOX PROCESSES

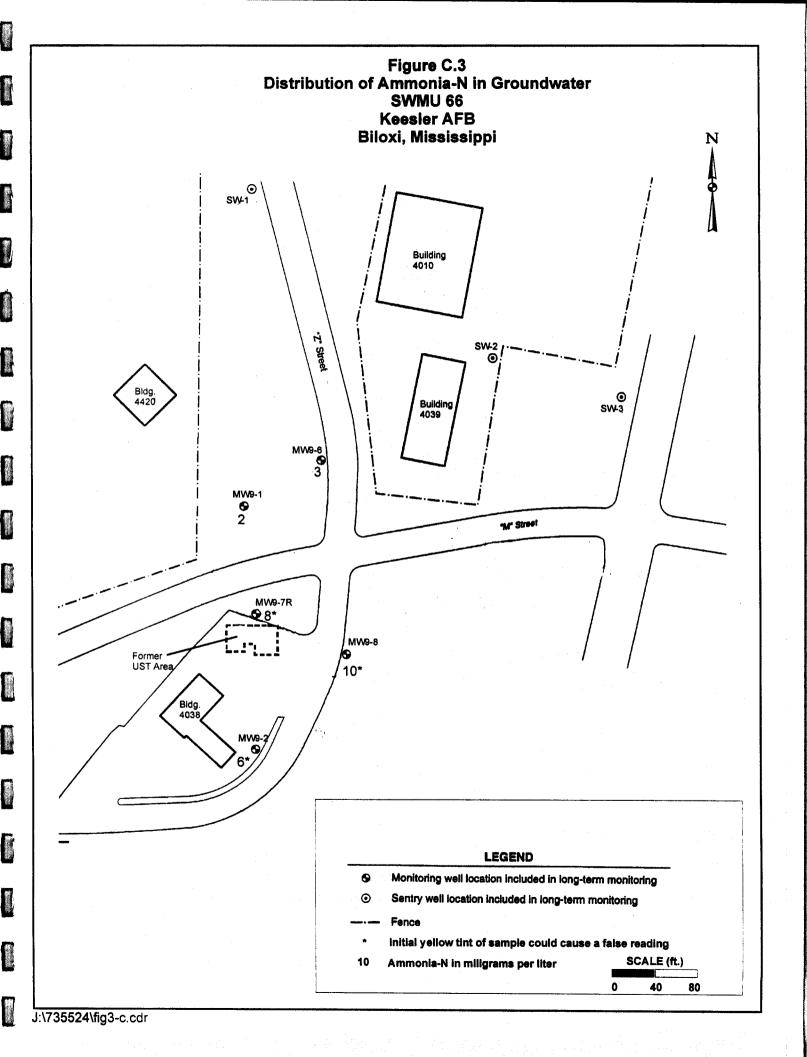
Risk-Based Approach to Remediation SWMU 66 Keesler AFB, Mississippi

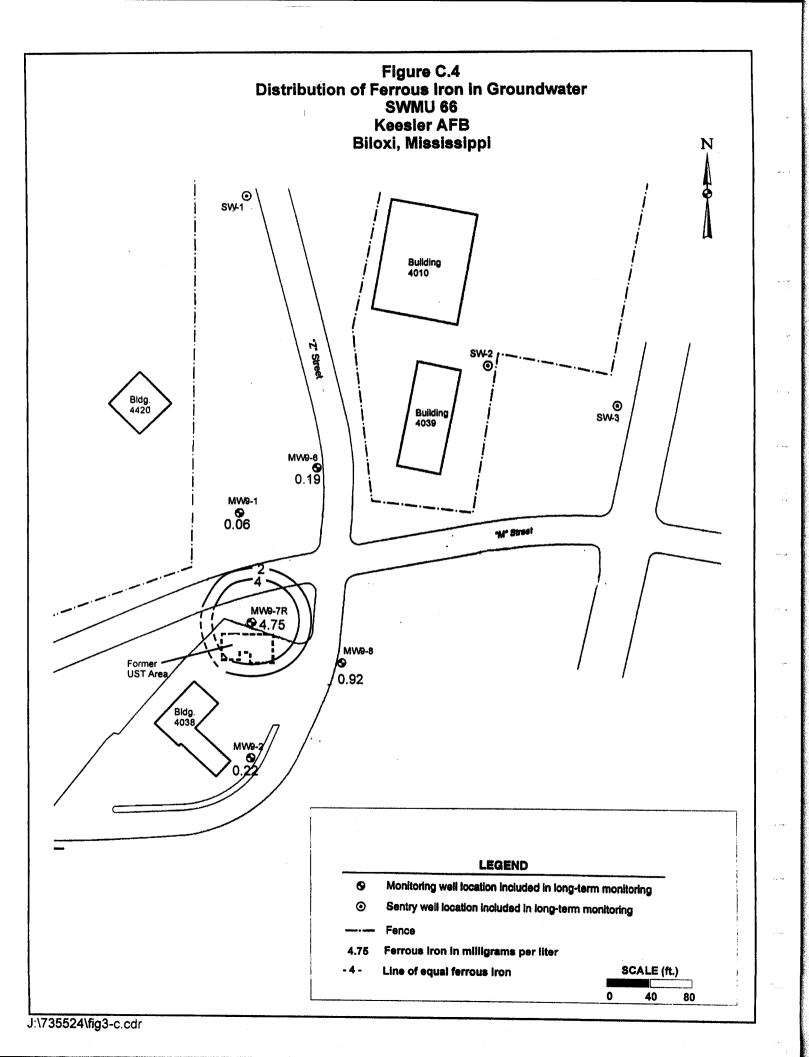
PARSONS ENGINEERING SCIENCE, INC.

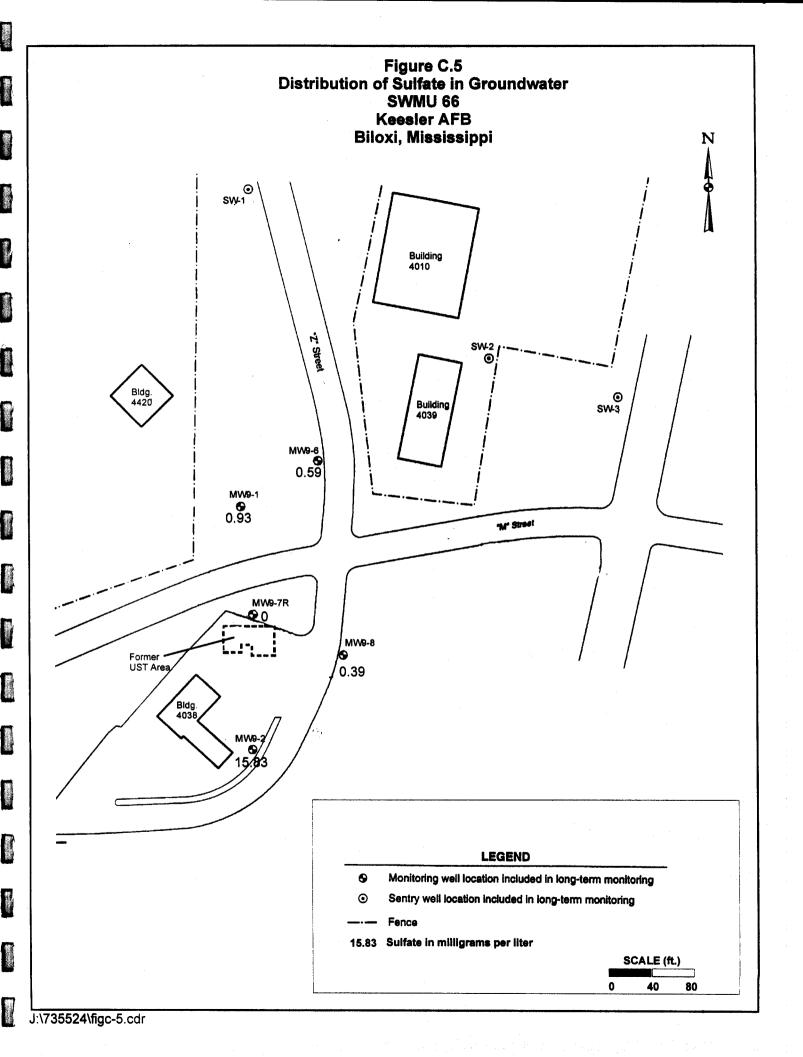
Atlanta, Georgia

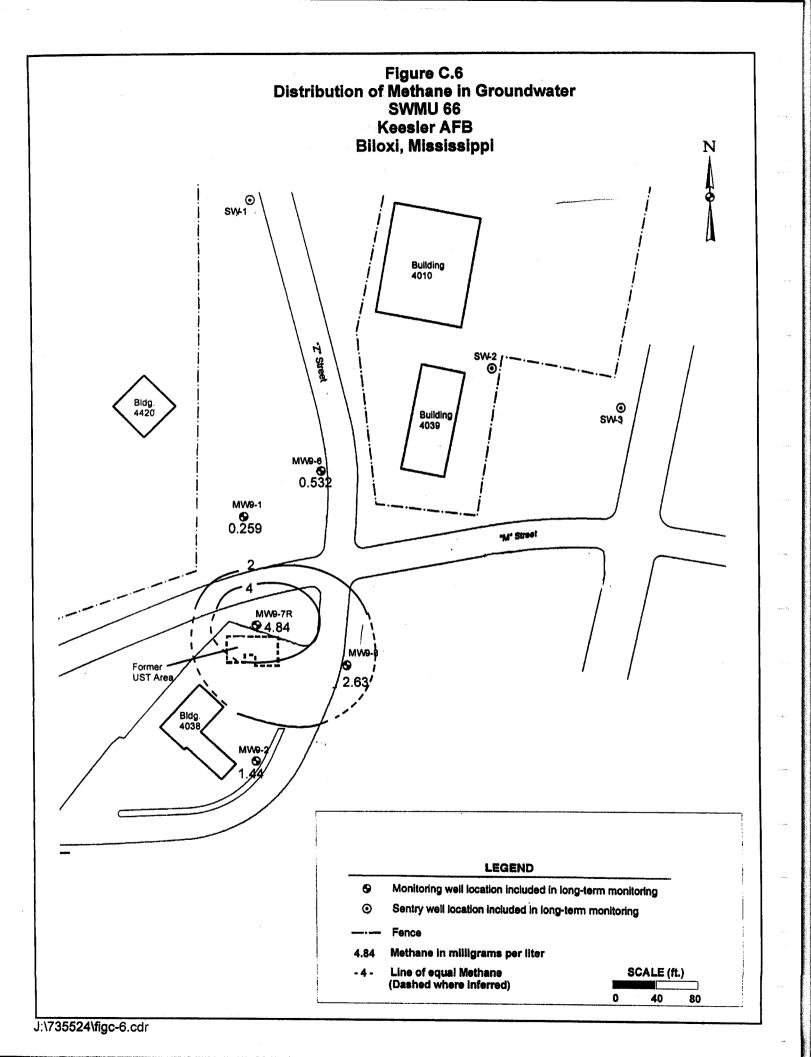
Adapted from Stumm and Morgan, 1981.











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TABLE C.1 HISTORICAL COMPARISON OF GROUNDWATER ANALYTICAL RESULTS SWMU 66 Kasalar AFR

Keesler AFB Biloxi, Mississippi

| | | | | | | | | | \bigcirc | | | |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|------------|-----------|-----------|-----------|
| Location: | | MW | 79-1 | | | MV | W9-2 | | | MW | 79-6 | |
| Sample Date: | 14-May-98 | 20-Aug-98 | 19-Nov-98 | 22-Jun-99 | 14-May-98 | 20-Aug-98 | 19-Nov-98 | 23-Jun-99 | 14-May-98 | 20-Aug-98 | 19-Nov-98 | 22-Jun-99 |
| Apr galler | | | | A | 0 | | | Δ | D | | | |
| Benzene | ND | ND | ND | < 1.0 0 | | ND | ND | < 1.0 6 | 195 | 20 | 10 | < 1.0 |
| Toluene | ND | ND | 1.3 | 2.9 | ND | ND | ND | < 1.0 | 1.6 | 2 | 2 | < 1.0 |
| Ethylbenzene | ND | ND | ND | < 1.0 | ND | ND | ND | < 1.0 | 5.4 | 22 | 6 | < 1.0 |
| Xylenes | ND | ND | ND | 4.9 | ND | ND | ND | < 1.0 | 5.9 | 6 | 3 | < 1.0 |
| Total BTEX 3,0 21 | ND | ND | ND | 7.8 N | ND | ND | ND | <4.0 N | NI) 207.9 | 50 | 21 | <4.0 |
| | | | | | | | | , | | | | |
| Methyl-t-butylether (MTBE) | ND | ND | ND | < 1.0 | ND | 2 | ND | < 1.0 | 10.7 | 9 | 3 | < 1.0 |

| Location: | ; ' | MW | 9-7R | | | MV | V9-8 | | | SV | 7-1 | |
|----------------------------|----------------|-----------|-----------|-----------|-----------|-----------|-----------|---------------|-----------|-----------|-----------|-------------|
| Sample Date: | 14-May-98 | 20-Aug-98 | 19-Nov-98 | 23-Jun-99 | 14-May-98 | 20-Aug-98 | 19-Nov-98 | 23-Jun-99 | 14-May-98 | 20-Aug-98 | 18-Nov-98 | 22-Jun-99 |
| 7-13 | | 9-7 | | 9-7R | | | | | | | | |
| Benzene Agras Dec 97 | NM | NM | NM | 44.5 | ND | 4 | ND | 232 | ND | ND | ND | < 1.0 |
| Toluene | NM | NM | NM | 47.7 | ND | 1 | ND | 41.0 | ND | ND | 1.6 | < 1.0 |
| Ethylbenzene | NM | NM | NM | 24.6 | ND | ND | ND | 7.7 | ND | ND | ND | < 1.0 |
| Xylenes | NM | NM | NM | 154 | ND | 5 | ND | 209.0 | ND | ND | ND | < 1.0 |
| Total BTEX 14,100 5,830 | NM | NM | NM | 270.8 | ND | 10 | ND | 489. 7 | ND | ND | 1.6 | <4.0 |
| Methyl-t-butylether (MTBE) | NM | NM | NM | 1.6 | 5.9 | 8 | ND | < 1.0 | ND | ND | ND | < 1.0 |

| Location: | | SW-2 | | | | W-3 | | |
|----------------------------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|-----------|
| Sample Date: | 14-May-98 | 20-Aug-98 | 18-Nov-98 | 22-Jun-99 | 14-May-98 | 21-Aug-98 | 18-Nov-98 | 22-Jun-99 |
| Benzene | ND | ND | ND | < 1.0 | NM | ND | ND | < 1.0 |
| Toluene | ND | ND | 1.4 | < 1.0 | NM | ND | 1.4 | < 1.0 |
| Ethylbenzene | ND | ND | ND | < 1.0 | NM | ND | ND | < 1.0 |
| Xylenes | ND | ND | ND | < 1.0 | NM | ND | ND | < 1.0 |
| Total BTEX | ND | ND | 1.4 | <4.0 | NM | ND | 1.4 | <4.0 |
| Methyl-t-butylether (MTBE) | ND | ND | ND | < 1.0 | NM | ND | ND | < 1.0 |

1998 data from LTM Report SWMU 66 (January 1998)

Bolded results indicate detected compounds.

Results are in µg/L.

ND = Not Detected

NM = Not Measured

TABLE C.2 COUPLED OXIDATION REACTIONS FOR BTEX COMPOUNDS SWMU 66 Keesler AFB, Biloxi, Mississippi

| Coupled Benzene Oxidation Reactions | Stoichiometric Mass Ratio of Electron Acceptor/Byproduct to Compound |
|---|--|
| $7.50_2 + C_6H_6 \Rightarrow 6CO_{2,g} + 3H_2O$ Benzene exidation /aerobic respiration | 3.07:1 |
| $6 NO_3 + 6H^+ + C_6H_6 \Rightarrow 6CO_{2g} + 6H_2O + 3N_{2g}$ Benzene oxidation / dentirification | 4.77:1 |
| 3.75 NO; $+ C_0H_6 + 7.5 H^+ + 0.75 H_2O \Longrightarrow 6 CO_2 + 3.75 NH_4^+$
Benzene oxidation / nitrate reduction | 2.98:1 |
| $\frac{60H^{+} + 30Fe(OH)_{3,a} + C_{6}H_{6} \Rightarrow 6CO_{2} + 30Fe^{2+} + 78H_{2}O}{Benzene \text{ oxidation / iron reduction}}$ | 21.5:1 |
| $7.5H^+ + 3.75SO_4^2 + C_6H_6 \Rightarrow 6CO_{2,g} + 3.75H_2S^\circ + 3H_2O$ Benzene oxidation / sulfate reduction | 4.61:1 |
| $5 N_2 + C_6 H_6 + 10 H^+ + 12 H_2 O \Longrightarrow 6 CO_2 + 10 NH_4^+$ Benzene oxidation / nitrogen fixation | 2.31:1 |
| $4.5 \mathrm{H}_2O + C_6 \mathrm{H}_6 \Rightarrow 2.25 \mathrm{CO}_{2,g} + 3.75 \mathrm{CH}_4$ Benzene oxidation / methanogenesis | 0.77:1 |

| Coupled Toluene Oxidation Reactions | Stoichiometric Mass Ratio of Electron Acceptor/Byproduct to Compound |
|--|--|
| $9O_2 + C_6H_5CH_3 \Rightarrow 7CO_{2,s} + 4H_2O$ Toluene oxidation /aerobic respiration | 3.13:1 |
| 7.2 NO <sub>3</sub> + 7.2 H <sup>+</sup> + C <sub>6</sub> H <sub>3</sub> CH <sub>3</sub> \Rightarrow 7 CO <sub>2,8</sub> + 7.6 H <sub>2</sub> O + 3.6 N <sub>2,8</sub> Toluene oxidation / dentitification | 4.85:1 |
| 4.5NO <sub>3</sub> + 9H <sup>+</sup> + 0.5H <sub>2</sub> O + C <sub>H3</sub> CH <sub>3</sub> \Rightarrow 7CO <sub>2</sub> + 4.5NH <sub>4</sub> <sup>+</sup>
Toluene oxidation / nitrate reduction | 3.03:1 |
| $72H^{+} + 36Fe(OH)_{3,a} + C_{6}H_{5}CH_{5} \Rightarrow 7CO_{2} + 36Fe^{2+} + 94H_{2}O$ Toluene oxidation / iron reduction | 21.86:1 |
| $9H^+ + 4.5 SO_2^2 + C_6H_1 CH_3 \Rightarrow 7CO_{2,g} + 4.5 H_2 S^2 + 4H_2 O$ Toluene oxidation / sulfate reduction | 4.7:1 |
| $6 N_2 + C_0 H_3 CH_3 + 12 H^+ + 14 H_2 O \Longrightarrow 7 CO_2 + 12 NH_4^+$ Toluene oxidation / nitrogen fixation | 2.35:1 |
| $5H_2O + C_6H_3CH_3 \Rightarrow 2.5CO_{2,g} + 4.5CH_4$ Toluene oxidation / methanogenesis | 0.78:1 |

TABLE C.2 (CONTINUED) COUPLED OXIDATION REACTIONS FOR BTEX COMPOUNDS SWMU 66 Keesler AFB, Biloxi, Mississippi

| Coupled Ethylbenzene Oxidation reactions | Stoichiometric Mass Ratio of Electron
Acceptor/Byproduct to Compound |
|---|---|
| $10.5O_2 + C_6H_5C_2H_5 \Rightarrow 8CO_{2,6} + 5H_2O$
Ethylbenzene oxidation /aerobic respiration | 3.17:1 |
| 8.4 NO <sub>3</sub> + 8.4 H <sup>+</sup> + C <sub>6</sub> H <sub>5</sub> C <sub>2</sub> H <sub>5</sub> \Rightarrow 8 CO <sub>24</sub> + 9.2 H <sub>2</sub> O + 4.2 N <sub>24</sub> Ethylbenzene oxidation / denitrification | 4.92:1 |
| 5.25NO <sub>3</sub> + 10.5H <sup>+</sup> + 0.25H <sub>2</sub> O + C_2 H <sub>3</sub> \Rightarrow 8CO <sub>2</sub> + 5.25NH <sub>2</sub> <sup>+</sup>
Ethylbenzene oxidation / nitrate reduction | 3.07:1 |
| $84H^{+} + 42Fe(OH)_{3,a} + C_{6}H_{5}C_{2}H_{5} \Rightarrow 8CO_{2} + 42Fe^{2+} + 110H_{2}O$ Ethylbenzene oxidation / iron reduction | 22:1 |
| $10.5H^+ + 5.25SO_4^2 + C_6H_5C_2H_5 \Rightarrow 8CO_{2,g} + 5.25H_2S^2 + 5H_2O$
Ethylbertzene oxidation / sulfate reduction | 4.75:1 |
| $7 N_2 + C_0 H_5 C_2 H_5 + 14 H^+ + 16 H_2 O \Longrightarrow 8 CO_2 + 14 NH_4^+$
Ethylbenzene oxidation / nitrogen fixation | 2.38:1 |
| $5.5H_2O + C_6H_5C_2H_5 \Rightarrow 2.75CO_{2,g} + 5.25CH_4$
Ethylbenzene oxidation / methanogenesis | 0.79:1 |

| Coupled m-Xylene Oxidation Reactions | Stoichiometric Mass Ratio of Electron Acceptor/Byproduct to Compound |
|--|--|
| $10.5O_2 + C_6H_4(CH_5)_2 \Rightarrow 8CO_{2,s} + 5H_2O$ m-Xylene oxidation /aerobic respiration | 3.17:1 |
| 8.4 NO <sub>3</sub> + 8.4 H <sup>+</sup> + $C_6H_4(CH_3)_2 \Rightarrow 8CO_{2,g} + 9.2H_2O + 4.2N_{2,g}$
m-Xylene oxidation / denitrification | 4.92:1 |
| $5.25NO_3^- + 10.5H^+ + 0.25H_2O + C_0H_4(CH_2)_2 \Rightarrow 8CO_2 + 5.25NH_4^+$
m-Xylene oxidation / nitrate reduction | 3.07:1 |
| $84H^{+} + 42Fe(OH)_{3,a} + C_{6}H_{4}(CH_{3})_{2} \Rightarrow 8CO_{2} + 42Fe^{2+} + 110H_{2}O$ $m-Xylene oxidation / iron reduction$ | 22:1 |
| $10.5H^+ + 5.25SO_4^2 + C_6H_4(CH_3)_2 \Rightarrow 8CO_{2,q} + 5.25H_2S^0 + 5H_2O$ m-Xylene oxidation / sulfate reduction | 4.75:1 |
| 7 N_2 + $C_0H_4(CH_9)_2$ + 14 H^+ + 16 $H_2O \Longrightarrow 8 CO_2$ + 14 NH_4^+ m-Xylene oxidation / nitrogen fixation | 2.38:1 |
| $5.5H_2O + C_6H_4(CH_3)_2 \Rightarrow 2.75CO_{2,g} + 5.25CH_4$ m-Xylene oxidation / methanogenesis | 0.79:1 |

TABLE C.3 SUMMARY OF GROUNDWATER GEOCHEMICAL DATA SWMU 66 Keesler AFB Biloxi, Mississippi

| Analyte | Units | MW9-1
22-Jun-99 | MW9-2
23-Jun-99 | MW9-6
22-Jun-99 | MW9-7R
23-Jun-99 | MW9-8
23-Jun-99 | SW-1
22-Jun-99 | SW-2
22-Jun-99 | SW-3
22-Jun-99 |
|------------------|-------|--------------------|--------------------|--------------------|---------------------|--------------------|-------------------|-------------------|-------------------|
| Ferrous Iron | mg/L | 0.06 | 0.22 | 0.19 | 4.75 | 0.92 | NS | NS | NS |
| Sulfate | mg/L | 0.93 | 15.83 | 0.59 | 0.00 | 0.39 | NS | NS | NS |
| Ammonia-N | mg/L | 2** | 6** | 3** | 8** | 10** | NS | NS | NS |
| Methane | mg/L | 0.259 | 1.44 | 0.532 | 4.84 | 2.63 | NS | NS | NS |
| Temperature | Deg C | 24.4 | 27.9 | 25.1 | 25.5 | 25.2 | 25.2 | 29.3 | 26.2 |
| рН | SU | 6.19 | 6.06 | 5.96 | 6.03 | 5.26 | 6.41 | 5.95 | 6.10 |
| Conductivity | μS/cm | 328 | 546 | 367 | 429 | 271 | 367 | 244 | 414 |
| Dissolved Oxygen | mg/L | 0.03 | 0.02 | 0.01 | 0.01 | 0.01 | 0.47 | 0.08 | 0.01 |
| ORP | mV | 35* | -120.6 | 47* | -75.0 | -106.5 | 29* | 64* | 50* |

Methane analysis performed by Specialized Assays, Inc of Nashville, TN; all other analyses performed in the field

U = The analyte was analyzed for and is not present above the reporting limit

ORP = oxidation reduction potential

mg/L = milligrams per Liter

μS/cm = microsiemen per centimeter

Deg C = degrees Celcius

mV = millivolt

SU = Standard Units

\* = ORP meter was working incorrectly. New meter received on June 23, 1999.

\*\* = Initial yellow tint of sample could cause an elevated reading.

NS = Not sampled.

R = Replacement well

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TABLE C.4 ESTIMATED ASSIMILATIVE CAPACITY OF SATURATED SOIL AND GROUNDWATER SWMU 66 Keesler AFB Biloxi, Mississippi

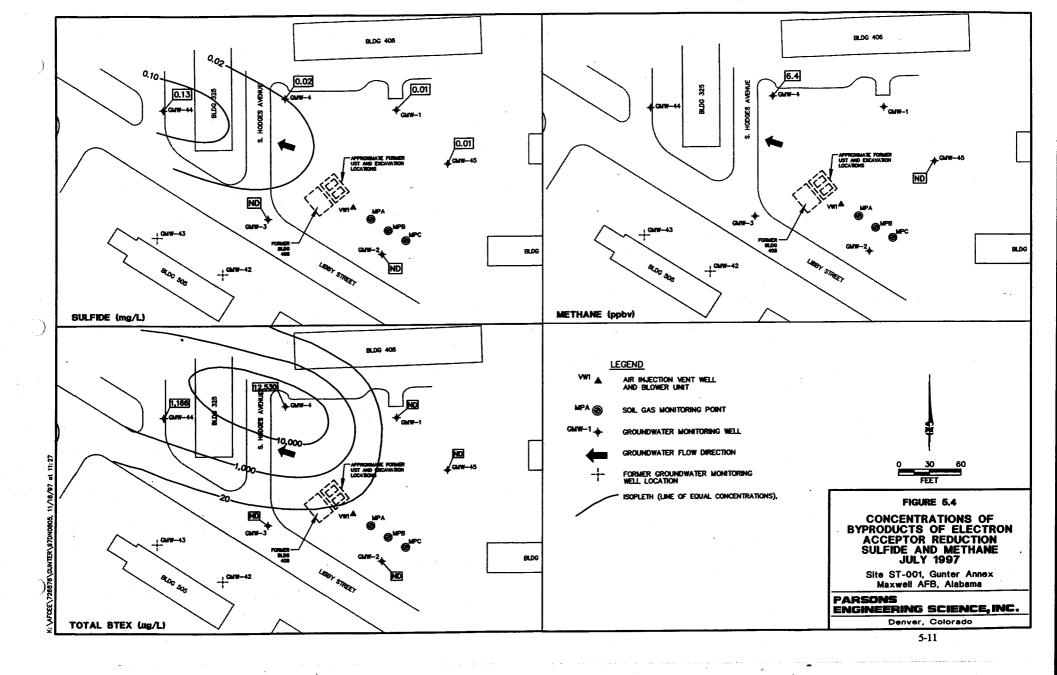
| Electron Acceptor
or Metabolic
Bypoduct | Background
Concentration
(mg/L) <sup>b/</sup> | Concentration in
Core of Plume
(mg/L) | BTEX Assimilative Capacity <sup>n'</sup> (mg/L) | Benzene
Assimilative
Capacity <sup>s/</sup>
(mg/L) | Toluene
Assimilative
Capacity <sup>a</sup> '
(mg/L) | Ethylbenzene Assimilative Capacity <sup>a</sup> (mg/L) | Xylenes
Assimilative
Capacity <sup>s/</sup>
(mg/L) |
|---|---|---|---|---|--|--|---|
| Oxygen | NA <sup>o</sup> | NA | NA | NA | NA | NA | NA |
| Ferrous Iron | NA | 4.75 | 0.22 | 0.22 | 0.22 | 0.22 | 0.22 |
| Sulfate | 15.83 | 0.00 | 3.37 | 3.43 | 3.37 | 3.33 | 3.33 |
| Ammonia <sup>d</sup> | 7.74 | 12.90 | 2.19 | 2.23 | 2.20 | 2.17 | 2.17 |
| Methane | NA | 4.84 | 6.19 | 6.29 | 6.21 | 6.13 | 6.13 |
| | Total
Max. 1999 Concentrat | ion | 11.96
0.49 | 12.17 | 11.99 | 11.84 | 11.84 |

<sup>&</sup>lt;sup>a'</sup> Calculation based on the ratio of the total mass of electron acceptor required to oxidize a given mass of the BTEX constituent

b/ mg/L = milligrams per liter

o' NA = not applicable

d' Concentration of ammonia = concentration of ammonia reported as N x 1.29 to convert to ammonia as NH<sub>4</sub>



(0.0064 mg/L). The presence of methane in this groundwater sample indicates that methanogenesis is occurring in the center of the plume where redox conditions can be expected to be the most reducing. The mass of reactive organic material present in the saturated soil and groundwater is potentially sufficient to reduce the oxidizing capacity to levels required for methanogenesis. However, the low magnitude of the detected methane concentration indicates that methanogenesis does not contribute significantly to the BTEX/naphthalene assimilative capacity of the groundwater.

5.4.7 Reduction/Oxidation Potential

Redox potential is a measure of the relative tendency of a solution to accept or transfer electrons. The redox potential of a groundwater system depends on which electron acceptors are being reduced by microbes during BTEX oxidation. The redox potentials measured at Site ST-001 ranges from 37 millivolts (mV) at GMW-4 to 177 mV at GMW-1. These redox potentials are within the range in which reduction of oxygen, nitrate, and manganese occurs (Stumm and Morgan, 1981). Although the redox potentials measured at the existing wells are outside the range for sulfate, ferric iron hydroxide, and carbon dioxide reduction, reduced forms of these compounds measured in downgradient groundwater samples indicates that reduction of these compounds has occurred in the center of the plume where redox conditions are expected to be the most reducing. Many authors have noted that measured redox data alone cannot be used to reliably predict the biodegradation that may be operating at a site (e.g. Stumm and Morgan, 1981; Godsey, 1994; Lovley et al., 1994). This is because the platinum electrode probes are not sensitive to some redox couples (e.g., the sulfate/sulfide redox couple). Redox potential data for the site are summarized in Table 5.1 and shown on Figure 5.1. As expected, areas with lower redox potentials appear to coincide with areas of high BTEX contamination; low DO, sulfate, and nitrate concentrations; and elevated manganese and ferrous iron concentrations.

5.5 EXPRESSED ASSIMILATIVE CAPACITY

The data presented in the preceding subsections suggest that degradation of dissolved BTEX and naphthalene is occurring primarily through the microbially mediated processes of aerobic biodegradation and anaerobic denitrification and sulfate reduction. On the basis of the stoichiometry, the total expressed assimilative capacity of the groundwater resulting from oxygen and sulfate reduction and denitrification is 5,920 $\mu g/L$ for dissolved BTEX and 6,240 $\mu g/L$ for dissolved naphthalene (Table 5.2). The additional assimilative capacities resulting from manganese, ferric iron, and carbon dioxide reduction were excluded from these estimates because these processes appear to be less significant degradation mechanisms. In addition, the assimilative capacity calculations may be conservative because they do not account for microbial cell mass production. The highest dissolved BTEX concentration measured at the site in 1998 was 8,500 $\mu g/L$ and the maximum naphthalene concentration measured in 1997 was 624 $\mu g/L$.

The geochemical data indicate that the groundwater has sufficient assimilative capacity to support substantial biodegradation of dissolved BTEX and naphthalene and to limit plume migration. This observation is supported by the fact that the site is an open system and that upgradient groundwater will continue to flow through the site and

TABLE 5.2 ESTIMATE OF ASSIMILATIVE CAPACITY OF SATURATED SOIL AND GROUNDWATER

SITE ST-001, GUNTER ANNEX MAXWELL AFB, ALABAMA

| | Background Concentration | BTEX Assimilative Capacity <sup>a/</sup> | Naphthalene
Assimilative
Capacity <sup>a/</sup> |
|-----------------------|--------------------------|--|---|
| Electron Acceptor | (μg/L) <sup>b/</sup> | (μg/L) | (μg/L) |
| Oxygen | 7500 | 2,340 | 2,400 |
| Nitrate | 15,400 | 3,040 | 3,270 |
| Sulfate | 2,760 | 540 | 570 |
| Total | | 5,920 | 6,240 |
| Maximum 1997 Concentr | ration | 12,530 | 624 |

<sup>&</sup>lt;sup>a</sup> Calculations based on the ratio of total mass of electron acceptors required to oxidize a given mass of contaminant.

 $<sup>^{</sup>b/}$ μ g/L = micrograms per liter.

replenish electron acceptor concentrations to sustain biodegradation of the dissolved plume. Ultimately, the fate of dissolved petroleum hydrocarbons in groundwater and the potential impact on receptors are dependent on the relationship between the kinetics of biodegradation and the solute transport velocity (Vroblesky and Chapelle, 1994). Although the expressed assimilative capacity is a strong indicator that biodegradation is occurring, it is not a confirmation that biodegradation will proceed to completion before potential downgradient receptors are impacted.

A closed system with 2 liters of water can be used to help visualize the physical meaning of assimilative capacity. Assume that the first liter contains no fuel hydrocarbons, but it contains fuel-degrading microorganisms and has an assimilative capacity of exactly "x" µg of fuel hydrocarbons. The second liter has no assimilative capacity; however, it contains fuel hydrocarbons. As long as these 2 liters of water are kept separate, biodegradation of the fuel hydrocarbons will not occur. If these 2 liters are combined in a closed system, biodegradation will commence and continue until the fuel hydrocarbons are depleted, the electron acceptors are depleted, or the environment becomes acutely toxic to the fuel-degrading microorganisms. Assuming a nonlethal environment, if fewer than "x" µg of fuel hydrocarbons were in the second liter, all of the fuel hydrocarbons will eventually degrade given a sufficient time; likewise, if greater than "x" µg of fuel hydrocarbons were in the second liter of water, only "x" µg of fuel hydrocarbons would ultimately degrade. The groundwater beneath Site ST-001 is an open system that continually receives additional electron receptors from flow through the aquifer and infiltration of precipitation. This means that the assimilative capacity is not fixed as it is in a closed system, and therefore cannot be compared directly to contaminant concentration in the groundwater. Rather, the expressed assimilative capacity of groundwater is intended to serve as a qualitative tool. The fate of BTEX in groundwater and the potential impact on receptors are dependent on the relationship between the kinetics of biodegradation and the solute transport velocity (Vroblesky and Chapelle, 1994). The significant expressed assimilative capacity (Table 5.2) is a strong indicator that biodegradation is occurring at Site ST-001.

SECTION 6

CONCLUSIONS AND RECOMMENDATIONS

6.1 CONCLUSIONS

Twenty-two months of bioventing treatment of vadose-zone soils at Site ST-001 successfully reduced the concentrations of BTEX and PAH compounds to concentrations below the ARBCA RBSLs. Residual hydrocarbons were only detected in laboratory soil samples collected from depths below 22 feet bgs, and only at low concentrations that no longer pose a threat to receptors through leaching to groundwater or volatilization into future onsite buildings or offsite structures. In addition, the presence of high concentrations of soil gas oxygen indicate that subsurface conditions are favorable for continued natural attenuation of the remaining hydrocarbons in the vadose zone.

Dissolved BTEX, PAHs, and lead in the groundwater at Site ST-001 do not and will not present a significant health or environmental risk. All target compounds detected in the confirmation groundwater samples and samples collected in 1998 were below RBSLs for inhalation of emissions by a resident child. Because the surficial aquifer beneath Gunter Annex is not used as a potable water source, and there are no seeps or other groundwater discharge points in the vicinity of the site, dissolved hydrocarbons in the groundwater do not pose a risk to human health or to ecological receptors through ingestion or direct contact. The depth (greater than 17 feet bgs) of residual soil contamination exceeding ISLs eliminates the direct contact exposure scenario. Although limited BTEX plume migration may occur, historical groundwater data show an overall decreasing trend for dissolved BTEX concentrations in the ST-001 source area (Table 4.4), and natural hydrodynamic and chemical attenuation processes should continue to reduce dissolved BTEX and PAH concentrations.

6.2 RECOMMENDATIONS

The confirmatory soil and groundwater sampling results presented in Sections 4.1 and 4.2 support an Air Force no-further-response-action-planned (NFRAP) decision for soil and groundwater contaminated by gasoline and diesel fuel in the immediate vicinity and downgradient from the former USTs, pursuant to closure of Site ST-001. Based on the site closure soil and groundwater sample analytical results summarized in Tables 4.1, 4.3 and 4.4, site closure with no further remedial action at the Site ST-001 is recommended. Concentrations of lead and all BTEX and PAH compounds are below their respective RBSLs, and remaining fuel hydrocarbons in the soils and groundwater do not and will not present a significant risk to human health and/or the environment at or downgradient form the site.

ADEM has made the determination that no further subsurface investigative or subsurface corrective actions will be required for Site ST-001 (ADEM, 1999). The bioventing system has been dismantled and removed from the site, and the VW and MPs have been properly abandoned by a base contractor.

SECTION 7

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APPENDIX A CONFIRMATION SAMPLING AND ANALYSIS PLAN



Confirmation Sampling and Analysis Plan for Site ST-001, Former Building 408, Gunter Annex



Maxwell Air Force Base Alabama



Air Force Center for Environmental Excellence Brooks Air Force Base, Texas

and

42 CES/CEVR Maxwell Air Force Base, Alabama

May 1997



DRAFT FINAL

CONFIRMATION SAMPLING AND ANALYSIS PLAN FOR SITE ST-001, FORMER BUILDING 408, GUNTER ANNEX

MAXWELL AIR FORCE BASE MONTGOMERY, ALABAMA

Prepared for:

Air Force Center for Environmental Excellence Brooks Air Force Base, Texas

and

42 CES/CEVR Maxwell Air Force Base, Alabama

May 1997

Prepared by:

Parsons Engineering Science, Inc. 1700 Broadway, Suite 900 Denver, Colorado 80290

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ACRONYMS AND ABBREVIATIONS

°C degrees centigrade µg/L micrograms per liter

ADEM Alabama Department of Environmental Management

ACL alternative corrective action limit

AFB Air Force Base

AFCEE Air Force Center for Environmental Excellence
ASTM American Society for Testing and Materials
BTEX benzene, toluene, ethylbenzene, and xylenes

CAL corrective action limit

CES/CEVR Civil Engineering Squadron, Environmental Group

COPC chemical of primary concern

DO dissolved oxygen

DOT US Department of Transportation

ft/ft foot per foot ID inside diameter

mg/kg milligrams per kilogram

MP monitoring point

NFRAP No Further Response Action Planned PAH polynuclear aromatic hydrocarbon Parsons ES Parsons Engineering Science, Inc.

PID photoionization detector

QC quality control

RBCA risk-based corrective action RBSL risk-based screening level

redox reduction oxidation

SAP Sampling and Analysis Plan

SSL soil screening level

TRPH total recoverable petroleum hydrocarbons

TVH total volatile hydrocarbons

TVHA total volatile hydrocarbon analyzer
USACE US Army Corps of Engineers
USCS Unified Soil Classification System
USEPA US Environmental Protection Agency

UST underground storage tank
VOC volatile organic compound

VW vent well

SECTION 1

INTRODUCTION

This confirmation sampling and analysis plan (SAP) for former Building 408, Site ST-001, at the Gunter Annex, Maxwell Air Force Base (AFB), Alabama has been prepared by Parsons Engineering Science, Inc. (Parsons ES) for submittal to the Alabama Department of Environmental Management (ADEM); the US Air Force Center for Environmental Excellence (AFCEE), Brooks AFB, Texas; and 42 Civil Engineering Squadron, Environmental Group (CES/CEVR), Maxwell AFB, Alabama. ADEM provides oversight of underground storage tank (UST) work at Gunter Annex. The SAP is intended to guide soil and groundwater sampling at Site ST-001 to document the effectiveness of remediation of petroleum-hydrocarbon-contaminated soils and to provide data for a risk-based assessment of contaminants remaining in site soils and groundwater. Site ST-001 is the location of a release of diesel fuel and/or gasoline from two former USTs and their associated product piping.

In 1994, Site ST-001 was selected as a pilot test site for the AFCEE Extended Bioventing Program. This ongoing program involves more than 50 in situ bioventing sites at 32 military installations nationwide and provides funding for pilot- and full-scale bioventing system installation, extended operation of installed bioventing systems, and completion of confirmatory soil sampling and site closure documents, if extended bioventing testing results indicate adequate site remediation has been achieved.

The pilot-scale bioventing system was installed and initial pilot testing was performed in September 1995 (Parsons ES, 1995). Following initial testing, the bioventing system was optimized, and system operation continued for 1 year. One-year testing was performed in October 1996. The purpose of the pilot test at Site ST-001 was to evaluate the effectiveness of bioventing in remediating unsaturated soils contaminated with petroleum hydrocarbons thought to have resulted from diesel fuel and/or gasoline released from the former USTs. Based on the results of the extended bioventing test, in situ bioventing appears to have reduced petroleum hydrocarbon contamination in site soils sufficiently to meet current ADEM (1995) corrective action limits (CALs) for total recoverable petroleum hydrocarbon (TRPH) concentrations; however, ADEM is currently in the process of finalizing new risk-based corrective action (RBCA) requirements for petroleum release sites.

The objective of the confirmation soil and groundwater sampling is to document the effectiveness of soil remediation at Site ST-001 and to demonstrate compliance with anticipated ADEM RBCA requirements for closure. The proposed confirmation sampling described in Section 4 targets vadose zone soils and groundwater in the vicinity of the former USTs, as well as impacted groundwater downgradient from the

site. Soil and groundwater data will be used to prepare a streamlined risk-based assessment of residual site contamination, and groundwater data also will be used to evaluate the rate of natural chemical attenuation occurring in groundwater. The groundwater and soil sampling effort is being performed as part of the AFCEE Extended Bioventing project. It is anticipated that analytical results will support an Air Force no-further-response-action-planned (NFRAP) recommendation, and that ADEM will grant site closure.

This SAP consists of nine sections, including this introduction. Section 2 includes site description, history, and summaries of previous investigations and remediation activities. Section 3 summarizes current ADEM CALs and provides a brief discussion of anticipated ADEM RBCA requirements. A detailed SAP is presented in Section 4. Analytical results will be presented in a confirmation sampling report as described in Section 5. Section 6 lists Maxwell AFB support requirements, and Section 7 presents the proposed project schedule. Air Force, regulatory, and contractor points of contact are provided in Section 8, and the cited references are provided in Section 9.

SECTION 2

SITE DESCRIPTION

2.1 SITE LOCATION AND HISTORY

Information provided in this section is summarized from a release investigation report by Radian Corporation (1995). Site ST-001 is located in the west-central portion of Gunter Annex, Montgomery, Alabama (Figure 2.1). The site is bordered by Libby Street on the south and South Hodges Avenue on the west. A grassy, open area bounds the site on the remaining sides. The layout of Site ST-001 is shown in Figure 2.2.

Site ST-001, also known as the old Base Motor Pool Service Station, was originally used for dispensing petroleum products for motorized vehicles beginning in the 1940's. Two 10,000-gallon USTs were located north of Building 408; one tank was used to store diesel fuel, and the other stored gasoline. The tanks and related piping were removed in March 1994. After the tanks were removed, the excavation was backfilled with clean soil and covered with gravel. Building 408 was demolished in 1995, and the site is currently vacant and inactive.

2.2 SITE GEOLOGY AND HYDROGEOLOGY

Site ST-001 is underlain by Quaternary alluvial deposits consisting of sand, gravel, silt, and clay layers. The grain size generally increases with depth, with approximately 8 to 10 feet of silty, sandy clay overlying sand and gravely sand. In the vicinity of the former UST and product piping excavation, much or all of the silty clay appears to have been removed and replaced with clean fill consisting of a mixture of clay, sand, and gravel.

At Site ST-001, shallow groundwater occurs under water table (unconfined) conditions. In July 1996, the surface of the water table was measured between 20 and 25 feet below ground surface (bgs), and groundwater was determined to flow toward the west-northwest with an average hydraulic gradient of 0.005 foot per foot (ft/ft) (Williams Engineering, 1996).

2.3 PREVIOUS INVESTIGATIONS

2.3.1 1991 US Army Corps of Engineers Investigation

During 1991, the United States Army Corps of Engineers (USACE, 1992) performed an initial investigation of Site ST-001 that included the installation of four groundwater monitoring wells (GMW-1 through -4, shown on Figure 2.2). Soil and groundwater samples were collected at these four locations. Soil samples were

analyzed for TRPH and groundwater samples were analyzed for benzene, toluene, ethylbenzene, total xylenes (BTEX), and lead. Analytical results indicated that TRPH concentrations exceeded 100 milligrams per kilogram (mg/kg) in soil samples collected from each of the monitoring well borings. The highest TRPH concentration, 1,117 mg/kg, was detected in the boring for GMW-2 at approximately 20 feet bgs. Soil analytical results from the USACE (1992) and subsequent investigations are presented in Table 2.1, and the estimated extent of soil contamination at Site ST-001 is shown on Figure 2.3.

Dissolved contaminant concentrations in a groundwater sample from GMW-4 exceeded current ADEM maximum contaminant levels of 5 micrograms per liter (μ g/L) and 1,000 μ g/L for benzene and toluene, respectively. The benzene concentrations in the GMW-1 and GMW-3 groundwater samples also exceeded current ADEM contaminant levels. Groundwater analytical results from the USACE (1992) and subsequent investigations are presented in Table 2.2.

2.3.2 1994 Investigations

Following removal of the two USTs in 1994, Radian Corporation (1995) installed four groundwater monitoring wells (GMW-42 through 45) in the vicinity of Site ST-001 (Figure 2.2) and collected soil and groundwater samples at these locations. Soil and groundwater samples were analyzed for TRPH, BTEX, and lead. Findings indicated relatively insignificant TRPH and BTEX concentrations in soil; however, dissolved petroleum contaminant concentrations were detected at GMW-44, approximately 170 feet downgradient from (west of) the former USTs. Soil and groundwater analytical results from the 1994 Radian investigation are included on Tables 2.1 and 2.2, respectively.

Benchmark Engineering (1994) also performed groundwater sampling for volatile organic compounds (VOCs) and polynuclear aromatic hydrocarbons (PAHs) at GMW-1 and GMW-45 during 1994. During this sampling event, petroleum contamination was not evident at GMW-1; however, trace concentrations of some VOCs and PAHs were evident in samples from GMW-45 (Table 2.2).

2.3.3 Parsons ES Investigation and Bioventing Pilot Test

In September 1995, a pilot-scale bioventing system was installed by Parsons ES (1995) at Site ST-001 to assess the potential of air injection bioventing for remediating the hydrocarbon contamination identified in vadose zone soils. The primary objectives of the pilot test were: 1) to assess the potential for supplying oxygen throughout the contaminated soil interval; 2) to determine the rate at which indigenous microorganisms would degrade fuel when supplied with oxygen-rich soil gas; 3) to evaluate the potential for sustaining fuel biodegradation rates until fuel contamination was remediated to concentrations below regulatory standards; and 4) to determine design parameters, such as air injection vent well (VW) spacing and air injection flow rates, if it was determined that a full-scale bioventing system was necessary to treat the entire volume of contaminated soils at Site ST-001.

TABLE 2.1 SOIL ANALYTICAL RESULTS

SITE ST-001

| GUNTER AN | INEX. | MAXWELL | AFB. | ALABAMA |
|-----------|-------|---------|------|---------|
|-----------|-------|---------|------|---------|

| | | | | A | nalyte | | |
|--------------------|----------------------|-----------------------|----------|-------------|--------------|-----------|---------|
| | Sample Depth | TRPH | Benzene | Toluene | Ethylbenzene | Xylenes | Lead |
| Sample Location | (feet bgs)* | (mg/kg) <sup>e/</sup> | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) |
| Corps of Engineers | | | | | | | |
| GMW-1 | 5 - 6 | 719 | ~ | | | | |
| | 10 - 11.5 | 59 | | | | *** | |
| | 15 - 16.5 | 548 | | | | | |
| | 20 - 21.5 | 95 | | | | | _ |
| | 25 - 26.5 | 272 | | | | | |
| | 30 - 31.5 | 71 | | | | | |
| GMW-2 | 5 - 6 | 111 | | | *** | | |
| O | 10 - 11.5 | 633 | | | | | |
| | 15 - 16.5 | 42 | | | - | *** | |
| | 20 - 21.5 | 1,117 | | | | | - |
| | 25 - 26.5 | 48 | | | | | |
| | 30 - 31.5 | | | ••• | | | |
| GMW-3 | 5 - 6 | 97 | _ | | | | |
| GM W-5 | 10 - 11.5 | ND * | | | | | |
| | 15 - 16.5 | 225 | _ | | | *** | |
| | 20 - 21.5 | 441 | | | | | |
| | 25 - 26.5 | ND | | | | | |
| | 30 - 31.5 | 44 | _ | | | | |
| GMW-4 | 5 - 6 | ND | | | | | |
| GMW-4 | 10 - 11.5 | ND | | _ | - | _ | |
| | 15 - 16.5 | 118 | _ | | | | |
| | 20 - 21.5 | 86 | | | | | |
| | 25 - 26.5 | ND | *** | _ | | | |
| | 30 - 31.5 | 96 | | | : **** | | |
| Radian* | | | | | | | |
| | | | | | . | \T | |
| SB01 (GMW-42) | 0 - 2.5 | ND | ND | ND | ND | ND | 8.4 |
| | 21 - 23 | 2.84 | ND | ND | ND | 0.001 | 2.5 |
| SB02 (GMW-43) | 11.5 - 14 | ND | ND | 0.001 | ND | ND | ND |
| , , | 14 - 16.5 | ND | ND | ND | ND | ND | 2.7 |
| | 21.5 - 24 | ND | ND | ND | ND | 0.131 | 5.4 |
| SB03 (GMW-44) | 11.5 - 14 | ND | ND | ND | ND | 0.004 | 4.3 |
| 3503 (GIVEN-44) | 19 - 21.5 | ND | ND | ND | ND | 0.003 | 2.8 |
| CD 4 (C) (T) (C) | | | ND | 0.026 | 0.003 | 0.008 | ND |
| SB04 (GMW-45) | 0-4 | ND | | 0.026
ND | ND | ND | 11.1 |
| | 11.5 - 14
14 - 19 | ND
ND | ND
ND | ND | ND | 0.004 | 3.5 |
| D 50¥ | 24 - 25 | | | | | | |
| Parsons ES | | | | | | | |
| VW-15 | 15 | 120 | <0.053 ¥ | 0.38 | 0.89 | 7.5 | |
| VW-20 | 20 | 6.9 | <0.055 | <0.055 | 1.0 | 5.9 | |
| MPA-15 | 15 | 410 | <0.053 | 0.12 | 1.1 | 7.5 | |
| MPA-20 | 20 | <3.5 | <0.053 | <0.053 | <0.053 | <0.13 | |
| MPB-15 | 15 | <3.5 | <0.052 | <0.052 | <0.052 | <0.13 | |
| MPB-20 | 20 | <3.7 | <0.055 | <0.055 | <0.055 | <0.14 | *** |

bgs = below ground surface.

TRPH = total recoverable petroleum hydrocarbons.

<sup>&</sup>quot; mg/kg = milligrams per kilogram.

Soil samples collected in 1991 by US Army Corps of Engineers (1992).

<sup>- =</sup> not analyzed.

<sup>&</sup>quot; ND = not detected; method detection limit not available.

<sup>&</sup>lt;sup>▶</sup> Soil samples collected in 1994 by Radian Corporation (1995).

Soil samples collected September 12, 1995, by Parsons ES (1995), prior to bioventing system startup.

 $<sup>^{*}</sup>$ < = analyte concentration is less than the laboratory reporting limit shown.

2-6

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TABLE 2.2 GROUNDWATER ANALYTICAL RESULTS COMPARED TO ADEM CRITERIA SITE ST-001

| <u></u> | | | | | | | | | Aı
(u | nalyte"
mits)" | | | | | | | |
|------------|---|----------------|--------------------------------|-------------------|-----------------------------|-------------------|----------------|------------------------------|--------------------------------|---------------------------------|-------------------------|-------------------------|--------------------------|--------------------|-----------------------|------------------------------------|------------------------------------|
| | | TRPH
(mg/L) | Benzene
(µg/L) | Toluene
(µg/L) | Ethyl-
benzene
(µg/L) | Xylenes
(μg/L) | Lead
(µg/L) | n-Butyl
benzene
(µg/L) | n-Propyl-
benzene
(µg/L) | Isopropyl-
benzene
(µg/L) | 1,2,4-
TMB
(μg/L) | 1,3,5-
ТМВ
(µg/L) | cis-1,2
DCE
(µg/L) | TCE
(µg/L) | Naphthalene
(μg/L) | 1-Methyl-
naphthalene
(μg/L) | 2-Methyl-
naphthalene
(µg/L) |
| Corrective | Action Limit | NA* | 5 | 1,000 | 700 | 10,000 | 15 | NA | NA | NA | NA | NA | 70 | 5 | NA | NA | NA |
| Sample Le | ocation (Sample Date) | | | | | | | | | | | | | | | | |
| GMW-1 | (1991) M <sup>d</sup>
(7/14/94) B <sup>M</sup>
(7/25/96) W <sup>d</sup> | | 5.1
< 1 <sup>y</sup>
< 1 | ND *
<4
<1 | 2.2
<1
<1 | 2.5
<1
<1 | 40
 | <u></u>
<1 |
<1
 | <1
 |
<1
 | <1
— | <1 | <u>-</u>
<1
 | ND
<2
 | ND <2 | ND
<2
 |
| GMW-2 | (1991) M
(7/25/96) W | **** | 1.7
<1 | ND
<1 | ND
<1 | ND
<1 | 5 | | | | | | | | ND
 | ND
 | ND
 |
| GMW-3 | (1991) M
(7/25/96) W | • | 33
1.1 | 39
<1 | 31
<1 | 120
3 | 78
 | | | | | | | | ND
 | ND
 | ND |
| GMW-4 | (1991) M
(7/25/96) W | | 290
< 500 | 3,300
7,210 | 240
1,820 | 5,200
8,020 | 43
— | | | | | | | | 160 | 19 | 39 |
| GMW-42 | (1994) R <sup>W</sup> | 0.898 | ND | ND | ND | ND | 1.3 7 | | | | | | | | •=•= | **** | |
| GMW-43 | (1994) R | 1.15 | ND | ND | ND | ND | 1.0 * | | • | | **** | | | | •••• | **** | |
| GMW-44 | (1994) R
(7/25/96) W | 0.902 | 43
37.3 | 7
189 | 12
152 | 25
423 | ND
 | **** | **** | | | | | | •••• | | |
| GMW-45 | (1994) R
(7/14/94) B
(7/25/96) W | 0.535
 | ND
7.7
<1 | ND
<4
<1 | ND
12
<1 | ND
37
<1 | 2.9 ¥ | 1.4 | 6 | 2.8 | 32 | 9.4 | 3.3 | 3.3 | ~~ | 2.1 | <u>~</u> |

TRPH = total recoverable petroleum hydrocarbons; TMB = trimethylbenzene; DCE = dichloroethene; TCE = trichloroethene.

mg/L = milligrams per liter; µg/L = micrograms per liter.

ADEM, 1995.

NA = no ADEM corrective action level available for this analyte.

<sup>&</sup>quot; Results from 1991 investigation (USACE, 1992).

not analyzed.

ND = not detected; method detection limit not available.

Results from 1994 investigation (Benchmark Engineering, 1994).

<sup>=</sup> analyte concentration is less than the laboratory reporting limit shown.

<sup>1996</sup> groundwater monitoring results (Williams Engineering, Inc., 1996).

Results from 1994 investigation (Radian Corporation, 1995).

Analyte detected in method blank.

The pilot-scale bioventing system was installed in the vicinity of the former USTs and consisted of one VW, three vapor monitoring points (MPs), and a blower unit (Figure 2.2). During installation of the pilot-scale system, soil and soil gas sampling, and respiration and air permeability testing were performed. Based on oxygen influence and air permeability testing performed during installation of the pilot-scale system, the long-term radius of oxygen influence around the VW was expected to exceed 65 feet at all depths and 100 feet at depths between 14 and 20 feet bgs. From this information, it was determined that the pilot-scale bioventing system was capable of delivering oxygen throughout the contaminated soil zone, making installation of a larger bioventing system unnecessary. A detailed description of the pilot-scale bioventing system design and initial testing results are provided in the Interim Pilot Test Results report prepared by Parsons ES (1995) for this site.

Following completion of pilot-scale system installation and testing, the system was started, optimized, and operated continuously until September 1996. In September, the system was shut down for over 1 month to allow soils and soil gas to come to equilibrium in order to compare initial and 1-year conditions. Soil gas samples were collected, and *in situ* respiration testing was performed from 29 October through 1 November 1996 following 1 year of system operation. The blower system was restarted following 1-year testing to continue bioventing treatment of site soils. Initial soil sampling results and initial and 1-year soil gas sampling and respiration testing results have been provided by Parsons ES (1997) to AFCEE and Maxwell AFB and are summarized below.

2.3.3.1 Soil Sampling Results

During installation of the pilot-scale bioventing system, soil samples were collected from the VW and MP boreholes to determine the extent of petroleum hydrocarbon contamination in the vicinity of the former USTs (Figure 2.2). Six soil samples collected at the VW, MPA, and MPB boreholes, from depths of 15 and 20 feet bgs, were submitted for laboratory analysis of several parameters, including TRPH and BTEX. As shown in Table 2.1, TRPH, toluene, ethylbenzene, and xylenes were detected in soil samples collected from the VW and MPA boreholes, which are located nearest the former USTs (Figure 2.2). TRPH concentrations of 120 mg/kg and 410 mg/kg were detected at VW-15 and MPA-15, respectively. These concentrations exceeded the ADEM (1995) CAL of 100 mg/kg for TRPH. Toluene, ethylbenzene, and xylenes were detected at maximum concentrations of 380 μ g/kg, 1,100 μ g/kg, and 7,500 μ g/kg, respectively. Benzene was not detected in any of the six soil samples (Table 2.1).

2.3.3.2 Soil Gas Sampling Results

Soil gas sampling was performed prior to, and following, 1 year of air injection bioventing to determine relative changes in total volatile hydrocarbon (TVH), BTEX, and oxygen concentrations. Initial soil gas field-screening results at the VW and MPs indicated depleted oxygen concentrations and high TVH concentrations, and suggested that air injection would oxygenate contaminated soils and enhance biodegradation of residual petroleum hydrocarbons. As can be seen from the field-screening results

presented in Table 2.3, static oxygen concentrations in soil gas have increased considerably with continued bioventing at the site. At all MPs, the VW, and at GMW-1 and GMW-45, soil gas oxygen levels were measured at, or near, natural atmospheric levels (20.9 percent) following 1 year of air injection bioventing. The widespread development of near atmospheric levels of soil gas oxygen indicate that biological oxygen demand, and consequently, aerobic fuel hydrocarbon biodegradation rates, have decreased substantially throughout the site, and strongly suggests that very little substrate (fuel hydrocarbons) remains in site soils.

The expected low concentrations of residual petroleum hydrocarbon contamination in site soils is further supported by soil gas field TVH measurements and laboratory results. Soil gas field screening results, presented in Table 2.3, indicate a consistent 2 to 3 order of magnitude reduction in the source area (VW, MPA, and MPB) and lesser, but significant reductions at locations surrounding the source area (MPC, GMW-1, and GMW-45). Initial and 1-year analytical results for MPA-15 and MPA-19 indicate BTEX and TVH concentrations in soil gas have been reduced approximately 3 orders of magnitude during 1 year of bioventing. Field and analytical soil gas results demonstrate that significant reductions in TVH and BTEX compounds have taken place within the VW's estimated 100-foot treatment radius.

2.3.3.3 Respiration Test Results

Observed in situ microbial respiration (oxygen utilization) rates have decreased significantly as a result of pilot-scale bioventing system operation at Site ST-001. As can be seen from the results presented in Table 2.4, significant reductions occurred in both respiration and fuel biodegradation rates following the first year of system operation. Average 1-year respiration rates measured 4 to 14 percent of the initial values. Similar reductions also are evident in calculated fuel biodegradation rates for the site. Oxygen utilization and fuel biodegradation rates typically decrease with continued bioventing as the lighter, more readily biodegraded hydrocarbons are preferentially destroyed over more biologically recalcitrant, higher-molecular-weight hydrocarbons. As demonstrated by the soil gas results presented in Table 2.3, the BTEX compounds have been almost completely biodegraded.

2.3.4 1996 Williams Engineering, Inc. Groundwater Sampling

In July 1996, Williams Engineering, Inc. (Williams, 1996) collected groundwater samples from wells GMW-1 through 4, GMW-44, and GMW-45, for laboratory analysis. As can be seen from the results presented in Table 2.2, BTEX compounds were detected in groundwater samples from wells GMW-3, GMW-4, and GMW-44. Benzene, detected at a concentration of 37.3 μ g/L in the sample from GMW-44, exceeded the ADEM benzene CAL of 5 μ g/L. The specific benzene concentration from the sample collected at GMW-4 could not be accurately quantified; however, an ethylbenzene concentration of 1,820 μ g/L and a toluene concentration of 7,210 μ g/L exceeded the respective ADEM CALs of 700 μ g/L and 1,000 μ g/L. From this investigation, the maximum downgradient extent of dissolved BTEX contamination was estimated to be approximately 250 feet downgradient from the former USTs (Williams, 1996).

TABLE 2.3 INITIAL AND 1-YEAR SOIL GAS FIELD AND LABORATORY ANALYTICAL RESULTS SITE ST-001

| | • | Field | Screening | Data | Laboratory Analytical Data* | | | | | | |
|----------------------|--------------------------------|---------------------|--------------------------------|--------------|-----------------------------|----------------------|-------------------|---------------------|-------------------|--|--|
| Sampling
Location | Sampling
Event <sup>b</sup> | Oxygen
(percent) | Carbon
Dioxide
(percent) | TVH° (ppmv)* | TVH
(ppmv) | Benzene
(ppmv) | Toluene
(ppmv) | Ethylbenzene (ppmv) | Xylenes
(ppmv) | | |
| vw | Initial | 3.8 | 4.5 | 10,800 | 21,000 | 190 | 360 | 160 | 480 | | |
| | 1-Year | 19.5 | 0.8 | 9 | | | | | | | |
| MPA-10 | Initial | 18.0 | 1.2 | 5,600 | | | | | | | |
| | 1-Year | 17.5 | 1.0 | 12 | •••• | | | | | | |
| MPA-15 | Initial | 1.0 | 7.7 | 8,000 | 15,000 | 140 | 130 | 170 | 400 | | |
| | 1-Year | 20.0 | 8.0 | 30 | 48 | <0.002 <sup>g/</sup> | 0.041 | 0.12 | 0.52 | | |
| MPA-19 | Initial | 0.0 | 8.0 | 12,000 | 22,000 | 200 | 170 | 98 | 250 | | |
| | 1-Year | 15.0 | 3.5 | 8 | 25 | <0.002 | 0.098 | 0.12 | 0.46 | | |
| MPB-10 | Initial | 11.0 | 3.0 | 4,000 | | | | **** | | | |
| | 1-Year | 18.5 | 1.5 | 25 | 10 | <0.002 | 0.059 | 0.051 | 0.10 | | |
| MPB-14 | Initial | 0.5 | 7.8 | 1,240 | | **** | **** | | | | |
| | 1-Year | 19.0 | 0.8 | 12 | | **** | | **** | • | | |
| MPB-18 | Initial | 1.4 | 4.9 | 2,200 | | | | | **** | | |
| | 1-Year | 19.5 | 8.0 | 7 | | | **** | | | | |
| MPC-10 | Initial | 17.0 | 0.7 | 780 | 290 | <0.011 | 0.160 | 0.014 | 0.011 | | |
| | 1-Year | | **** | | | | | | | | |
| MPC-14 | Initial | 5.8 | 4.1 | 480 | 97 | <0.004 | 0.005 | <0.004 | 0.006 | | |
| | 1-Year | 19.0 | 1.0 | 19 | 5.2 | <0.002 | 0.044 | 0.052 | 0.084 | | |
| MPC-18 | Initial | 6.0 | 4.1 | 520 | 160 | <0.006 | 0.019 | 0.018 | 0.028 | | |
| | 1-Year | 20.0 | 0.5 | 5 | | | | | | | |
| GMW-1 | Initial | 10.0 | 5.0 | 280 | | **** | | | | | |
| | 1-Year | 20.0 | 1.0 | 60 | **** | | | | | | |
| GMW-45 | Initial | 10.5 | 5.5 | 94 | | | | | | | |
| | 1-Year | 20.0 | 2.0 | 15 | | | | | | | |

Sampling location identifies the monitoring point and depth in feet below ground surface.

<sup>&</sup>lt;sup>™</sup> Soil gas sampling performed in September 1995 (initial event) and October 1996 (1-year event).

<sup>&</sup>quot;TVH = total volatile hydrocarbons.

ppmv = parts per million, volume per volume.

<sup>\*</sup>Laboratory analysis of soil gas performed using USEPA Method TO-3. Laboratory TVH referenced to a molecular weight of 156 grams per mole.

<sup>=</sup> not analyzed.

<sup>&</sup>quot; <= analyte concentration is less than the laboratory reporting limit shown.

TABLE 2.4 INITIAL AND 1-YEAR RESPIRATION AND FUEL BIODEGRADATION RATES SITE ST-001 **GUNTER ANNEX, MAXWELL AFB, ALABAMA**

| Initial (Sept | ember 1995) | 1-Year (October 1996) | | | |
|--|--|--|--|--|--|
| Respiration
Rate
(% oxygen/hour) | Degradation
Rate <sup>b</sup>
(mg/kg/year) <sup>c/</sup> | Respiration
Rate
(% oxygen/hour) | Degradation
Rate <sup>b</sup>
(mg/kg/year) <sup>c/</sup> | | |
| 0.17 | 630 | NM <sup>d/</sup> | NC°′ | | |
| 0.16 | 590 | 0.023 | 110 | | |
| 0.14 | 540 | 0.0051 | 24 | | |
| NM | NC | 0.0058 | 31 | | |
| | Respiration Rate (% oxygen/hour) 0.17 0.16 0.14 | Rate (% oxygen/hour) (mg/kg/year) <sup>c/</sup> 0.17 630 0.16 590 0.14 540 | Respiration Rate Degradation Rate Respiration Rate (% oxygen/hour) (mg/kg/year)et (% oxygen/hour) 0.17 630 NMdt 0.16 590 0.023 0.14 540 0.0051 | | |

Location-Depth gives screened interval location and depth in feet below ground surface.

b' Initial and 1-year degradation rates based on moisture content of the soil during initial sampling. 1-year soil sampling was not performed.

Milligrams of hydrocarbons per kilogram of soil per year.

MM = not measured.

of NC = not calculated.

2.3.5 Results Summary

2.3.5.1 Soil

Soil sample results from the 1991 through 1995 investigations indicated the highest concentrations of TRPH and other fuel-related hydrocarbons occurred in vadose zone soils in the immediate vicinity of the former UST. Figure 2.3 shows the estimated extent of TRPH soil contamination at Site ST-001 that originally exceeded the ADEM CAL of 100 mg/kg. Based on the 1991, 1994, and 1995 investigations, soil contamination appeared to exceed regulatory requirements in the area circumscribed by GMW-1 through GMW-4, and as a result, a bioventing pilot-scale system was installed near the former UST location.

Initial and 1-year bioventing pilot test results indicate the effective treatment area of the bioventing system encompasses the entire area of contaminated soil identified on Figure 2.3. Significant reductions in TVH and BTEX soil gas concentrations and in oxygen utilization and fuel biodegradation rates following 1 year of bioventing are evident (Tables 2.3 and 2.4). Based on this information, TRPH concentrations in vadose zone soils at Site ST-001 are expected to be less than the CAL of 100 mg/kg; based on this expectation, AFCEE recommended that planning for confirmation sampling be initiated while the bioventing pilot-scale system continues to operate.

2.3.5.2 Groundwater

Dissolved benzene, toluene, and ethylbenzene concentrations in groundwater have exceeded ADEM (1995) criteria during 1991, 1994, and 1996 sampling events. BTEX concentrations from groundwater samples collected in 1996 from GMW-4 and GMW-44 indicate downgradient contaminant plume migration has occurred (Figure 2.3); dissolved BTEX contamination is estimated to extend approximately 250 feet downgradient from the former USTs (Williams, 1996). There is no indication that floating free product has been present on groundwater at the site, nor is there evidence of a significant smear zone from which chemicals of concern could continue to partition to groundwater. One-year bioventing pilot test results strongly indicate that petroleum contamination present in source area soils has been substantially reduced, and as a result, the extent of the dissolved plume is now thought to be stable, or decreasing.

Elevated levels of lead and trace levels of PAHs and VOCs have been detected in groundwater during previous investigations. Lead and PAH contamination of groundwater is likely to be the result of gasoline and/or diesel fuel releases from the original USTs. The source of VOCs detected at well GMW-45 is unknown. Based on information available from previous site investigations and from personnel at Maxwell AFB, no solvents or other sources of VOCs are known to exist at the former Building 408 site.

SECTION 3

SITE CLEANUP REQUIREMENTS

3.1 SITE CHARACTERIZATION REQUIREMENTS

The objective of the confirmatory soil and groundwater sampling is to support an NFRAP recommendation for the soils and groundwater contaminated by diesel fuel and/or gasoline in the vicinity of the former USTs, pursuant to closure of Site ST-001. This SAP targets unsaturated soils and groundwater in the vicinity of the former USTs, and groundwater immediately downgradient from the site.

3.2 STATE SOIL AND GROUNDWATER CLEANUP STANDARDS

ADEM currently allows evaluation of fuel hydrocarbon contaminants in soil and groundwater by established generic CALs, or by site-specific alternative corrective action limits (ACLs). The ACLs are established by conducting a site-specific risk-based evaluation to determine threats to potential receptors. The procedure for establishing the ACLs is currently reviewed on a site-by-site basis until such time as ADEM finalizes its RBCA program.

The forthcoming ADEM RBCA program will be a tiered, risk-based approach for clean up of petroleum-hydrocarbon-contaminated sites that is similar to the American Society for Testing and Materials (ASTM, 1995) RBCA decision-making process and AFCEE (1996) RBCA strategy. This iterative approach allows first for screening of contaminant concentrations against generic risk-based concentrations, followed by the development of site-specific cleanup criteria based on an analysis of site data and receptors that could potentially be exposed to chemical contamination at, or downgradient from, the release site. For the purpose of this SAP, it is assumed that the forthcoming RBCA standards being developed will be used by ADEM to evaluate the site. The ADEM RBCA program is anticipated to be finalized in Spring/Summer 1997. In the event that the new ADEM RBCA criteria are not available following site confirmation soil and groundwater sampling (Section 4) and prior to formation of the confirmation sampling report (Section 5), Parsons ES and Maxwell AFB will seek guidance from ADEM as to the appropriate course of action.

It is expected that forthcoming ADEM RBCA criteria will require an evaluation of BTEX and possibly other fuel contaminant (e.g., PAHs and lead) concentrations in soil and groundwater, given the likelihood that both diesel fuel and gasoline were released at Site ST-001. Because RBCA criteria are based on current or foreseeable land uses and human receptor exposure scenarios, a review of available information is provided below.

3.2.1 Land Use and Potential Receptors

Current land use adjacent to the site is commercial and residential. Housing is located north and east (upgradient) of Site ST-001. Vacant land and office buildings are located south and west (downgradient) of the site. Future land use for Site ST-001 has not been established, but would likely be industrial or commercial. For purposes of discussion and comparison, residential land use scenarios also are presented below as a very conservative estimate of future land use. Additional research into current zoning and future land use plans will be conducted under this work plan to refine the potential receptors that could be exposed to site related contaminants.

Based on these land use assumptions and the site description presented in Section 2, current and future onsite workers are likely to represent the primary human receptor population. However, residential populations also may represent a conservative potential future receptor if plume migration continues downgradient from the original source area (USTs), and if future residential development occurs in downgradient areas. No ecological receptors are likely to be exposed to contaminants in site media under current or anticipated future land uses.

Currently there is no on-Base beneficial use of groundwater from the shallow aquifer. Gunter Annex obtains its drinking water from the local municipality. As a result, exposure of onsite and off-site human receptors to site contaminants through ingestion of, inhalation of, or dermal contact with contaminants in groundwater extracted for potable use is unlikely. Soil sample results from previous investigations (Table 2.1) indicate that soil contamination appears to be significant only within soils located greater than 5 feet bgs (Table 2.1).

Based on this information, it is anticipated that the most significant contaminant migration pathway resulting from soil contamination at Site ST-001 is the leaching of contaminants from soil to groundwater. Volatilization of fuel hydrocarbons from soil and/or groundwater and vapor migration into onsite or off-site structures is expected to be the most significant exposure pathway resulting from contamination at Site ST-001.

3.2.2 Cleanup Criteria

3.2.2.1 Corrective Action Levels

The current ADEM CAL for petroleum contaminated soils is related to TRPH rather than BTEX or PAH contamination. Considering the TRPH concentrations detected in site soils prior to air injection bioventing (Table 2.1), the site is likely to now meet the current TRPH CAL of 100 mg/kg; however, new RBCA criteria are likely to require an evaluation of the individual petroleum hydrocarbons that pose the greatest risk to potential receptors in the vicinity of the site.

3.2.2.2 Potential ADEM RBCA Criteria

Based on the assumption that the forthcoming ADEM RBCA program will resemble the tiered approach outlined by ASTM (1995), ADEM will develop or adopt generic screening-level concentrations to support Tier 1 analysis and identification of chemicals

of potential concern (COPCs). The screening-level target concentrations will likely resemble the Tier 1 Risk-Based Screening Levels (RBSLs) presented in the ASTM (1995) look-up table. BTEX and other common petroleum contaminant (e.g., PAH and lead) concentrations in soil and groundwater at Site ST-001 will be determined in accordance with Section 4, in order to compare these values with ADEM screeninglevel concentrations. From this comparison, if the detected site contaminant concentrations do not exceed the most stringent respective screening-level target concentrations or RBSLs, the compounds will not be considered COPCs, and will not be retained for further Tier 2 evaluation. Under these circumstances, no additional remediation would be warranted for such compounds in order to protect human and ecological receptors. If a detected site contaminant exceeds the appropriate screeninglevel concentration, the compound is identified as a COPC and retained for further quantitative fate and transport and risk analyses. While an estimation of the ADEM Tier 2 process would be premature, an example Tier 1 evaluation presented below demonstrates that collection of soil and groundwater confirmation samples at Site ST-001 is warranted.

For the purpose of comparison, generic screening-level concentrations for both commercial/industrial and residential land use and maximum TRPH, BTEX, and lead soil concentrations detected during previous site investigations (Section 2.3) are presented in Table 3.1. Table 3.2 presents similar data for groundwater. The generic screening-level concentrations shown are from the ASTM (1995) Standard Guide for Risk-Based Corrective Action Applied at Petroleum Release Sites and the US Environmental Protection Agency (USEPA, 1996) Soil Screening Guidance: Technical Background Document. As previously mentioned, leaching of hydrocarbon contaminants from soil to groundwater and volatilization of contaminants from groundwater and vapor intrusion to buildings are likely to represent the most significant contaminant migration and exposure pathways represented by soil and groundwater contamination, respectively. Inhalation of VOCs in indoor air is considered the most likely exposure route.

As can be seen on Table 3.1, the only detected soil contaminant exceeding any of the estimated future risk-based screening concentrations is ethylbenzene. The soil leaching screening level (SSL) of 0.7 mg/kg for ethylbenzene assumes that no dilution or attenuation has occurred between the original source area and the receptor exposure point. This screening level is likely to be extremely conservative. While not readily apparent, benzene concentrations from the 1995 soil sampling event also may have exceeded the ASTM residential leachability RBSL and the USEPA groundwater migration SSLs because the analytical method detection limit shown is higher than these target screening levels. However, following more than 1.5 years of air injection bioventing, residual petroleum hydrocarbon contamination in soil is likely to be less than forthcoming ADEM screening-level concentrations.

The estimated risk-based criteria for groundwater shown in Table 3.2 represent dissolved concentrations of BTEX and naphthalenes that potentially could cause adverse indoor air concentrations resulting from contaminant vapor intrusion. These values represent a worst-case scenario, as no buildings currently are located directly above the area affected by the contaminant plume (Figure 2.3). Dissolved benzene, toluene, and ethylbenzene concentrations in groundwater samples from 1996 exceed their current

TABLE 3.1 SOIL CONTAMINANT LEVELS COMPARED TO EXISTING AND ESTIMATED FUTURE RISK-BASED CLEANUP CRITERIA SITE ST-001

GUNTER ANNEX, MAXWELL AFB, ALABAMA

| | | | | ASTM* | | TM <sup>*/</sup> | | USEPA <sup>W</sup> | | |
|--------------|---------------------|---|-------------------------------------|-------------------------------------|---|----------------------|-------------------|--|--|--|
| | Units <sup>e/</sup> | Detected Site
Maximum
Concentration | Current
ADEM
CAL <sup>4</sup> | Residential
Leachability
RBSL | Comm/Indus
Leachability
RBSL <sup>9</sup> | Ingestion
SSL | Inhalation
SSL | Groundwater
Migration
SSL (20 DAF) <sup>s/</sup> | Groundwater
Migration
SSL (1 DAF) <sup>h</sup> | |
| TRPH | mg/kg | 1,117 | 100 | NA | NA | NA | NA | NA | NA | |
| Benzene | mg/kg | <0.055 <sup>j</sup> | NA | 0.0172 | 0.0578 | 22 | 0.8 | 0.03 | 0.002 | |
| Toluene | mg/kg | 0.38 | NA | 129 | 361 | 16,000 | 650 | 12 | 0.6 | |
| Ethylbenzene | mg/kg | 1.1 | NA | 575 | 1,610 | 7,800 | 400 | 13 | 0.7 | |
| Xylenes | mg/kg | 7.5 | NA | RES <sup>k</sup> | RES | 160,000 <sup>v</sup> | 410 <sup>V</sup> | 190 <sup>v</sup> | 9^{ν} | |
| Naphthalenes | mg/kg | m/ | NA | 22.9 | 64.2 | 3,100 | NA | 84 | 4 | |
| Lead | mg/kg | 11.1 | NA | NA | NA | 400° | .w | _n/ | _m/ | |

Note: The corrective action limits or target concentrations exceeded by the maximum site concentration detected are shown in gray.

<sup>\*</sup> Risk-based screening levels (RBSLs) from Table X2.1 (ASTM, 1995).

<sup>&</sup>lt;sup>™</sup> Generic soil screening levels (SSLs) from Table A-1 (USEPA, 1996).

<sup>&</sup>quot; mg/kg = milligrams per kilogram.

<sup>#</sup> ADEM (1995) corrective action limits.

Values shown represent example Tier 1 Risk-Based Screening Levels (RBSLs) for residential receptor scenario considering soil-leachate to protect groundwater ingestion target level (ASTM, 1995).

Values shown represent example Tier 1 Risk-Based Screening Levels (RBSLs) for commercial/industrial receptor scenario considering soil-leachate to protect groundwater ingestion target level (ASTM, 1995).

<sup>&</sup>quot;Generic SSL values for the migration to groundwater pathway developed using a default dilution-attenuation factor (DAF) of 20 to account for natural processes that reduce contaminant concentrations in the subsurface.

Generic SSLs for the migration to groundwater pathway developed assuming no dilution or attenuation between the source and the receptor well (i.e., DAF = 1). Note that the 20 DAF values are not exactly 20 times the 1 DAF values because each SSL is calculated independently with the final value rounded to two significant figures for values greater than 10, and one significant figure if the value is less than 10.

Farget data concentrations not available in the sources which are referenced.

y <= analyte concentration less than laboratory reporting limit shown.

WRES = Selected risk level is not exceeded for pure compound present at any concentration (ASTM, 1995).

V SSL data provided is for o-Xylene which has the most conservative SSLs of the three xylene isomers.

<sup>---</sup> no site data yet available for this analyte.

<sup>&</sup>quot; USEPA has set a screening level of 400 mg/kg for lead based on the Revised Interim Soil Lead Guidance for CERCLA Sites and RCRA Corrective Action Facilities (1994).

TABLE 3.2 GROUNDWATER CONTAMINANT LEVELS COMPARED TO EXISTING AND ESTIMATED FUTURE RISK-BASED CLEANUP CRITERIA SITE ST-001

GUNTER ANNEX, MAXWELL AFB, ALABAMA

| | | | | AS | ΓM <sup>e/</sup> |
|--------------|---------------------|-------------------------------------|-------------------------------------|--|---|
| | Units <sup>b/</sup> | Detected Site Maximum Concentration | Current
ADEM
CAL <sup>e</sup> | Residential
Vapor Intrusion
RBSL <sup>d'</sup> | Comm/Indus
Vapor Intrusion
RBSL <sup>e/</sup> |
| Benzene | μg/L | 290° | 5 | 23.8 | 73.9 |
| Toluene | μg/L | 7,210 | 1.000 | 32,800 | 85,000 |
| Ethylbenzene | μg/L | 1,820 | 700 | 77,500 | >S <sup>g/</sup> |
| Xylenes | μg/L | 8,020 | 10,000 | >S | >S |
| Naphthalenes | μg/L | 218 <sup>h/</sup> | NA | 4,740 | 12,300 |
| Lead | μg/L | 78 | 159 | NA | NA |
| Lead | μg/L | 78 | 15' | NA |] |

Note: The corrective action limits or target concentrations exceeded by the maximum site concentration detected are shown in gray.

<sup>&</sup>lt;sup>a'</sup> Risk-based screening levels (RBSLs) from Table X2.1 (ASTM, 1995).

<sup>&</sup>lt;sup>b</sup> μg/L = micrograms per liter.

of ADEM (1995) corrective action limits.

Walues shown represent example Tier 1 Risk-Based Screening Levels (RBSLs) for residential receptor scenario considering vapor intrusion from groundwater to buildings (ASTM, 1995).

Values shown represent example Tier 1 Risk-Based Screening Levels (RBSLs) for commercial/industrial receptor scenario considering vapor intrusion from groundwater to buildings (ASTM, 1995).

<sup>&</sup>lt;sup>g</sup> July 1996 sample result from GMW-4 had a method detection limit of 500 μg/L, and as a result, the actual groundwater concentration from this sampling event may have been higher than the 1991 concentration shown.

<sup>&</sup>quot;>S = selected risk level is not exceeded for all possible dissolved levels (less than or equal to solubility of pure component) (ASTM, 1995).

Walue shown represents the sum of naphthalene, 1-methylnaphthalene, and 2-methylnaphthalene groundwater concentrations from the GMW-4 1991 sample results.

V Target data concentrations not available in the sources which are referenced.

Frepresents the action level for lead in drinking water.

CALs; however, fuel contaminant concentrations in groundwater do not exceed generic ASTM (1995) RBSLs. As can be seen from Tables 2.2 and 3.2, dissolved lead concentrations at GMW-1, GMW-3, and GMW-4 all exceed the federal 15- μ g/L action level for lead in drinking water. Because current drinking water sources in the vicinity of Site ST-001 are not threatened by existing groundwater contamination, lead concentrations in shallow groundwater do not pose a risk to ecological or human receptors.

3.3 NATURAL ATTENUATION OF DISSOLVED FUEL CONTAMINANTS

An accurate estimate of the potential for natural biodegradation of BTEX compounds in groundwater is important to consider when determining whether fuel hydrocarbon contamination presents a substantial continuing threat to human health and the environment, and when deciding what type of remedial alternative will be most cost effective in eliminating or abating these threats. Over the past two decades, numerous laboratory and field studies have demonstrated that subsurface microorganisms can degrade a variety of hydrocarbons (Lee, 1988). This process occurs naturally when sufficient oxygen (or other electron acceptors) and nutrients are available in the groundwater. The rate of natural biodegradation is generally limited by the lack of oxygen (or other electron acceptors) rather than by the lack of nutrients such as The supply of oxygen to unsaturated soil is constantly nitrogen or phosphorus. renewed by vertical diffusion from the atmosphere. The supply of oxygen to a shallow, fuel-contaminated aquifer is constantly renewed by the influx of oxygenated, upgradient flow and recharge from precipitation and by the vertical diffusion of oxygen from the unsaturated soil zone into the groundwater (Borden and Bedient, 1986). The rate of natural biodegradation in unsaturated soil and shallow aquifers is largely dependent upon the types and degree of weathering of the contaminants present, and the rates at which oxygen and other electron acceptors enter the contaminated media.

The positive effect of natural attenuation processes (e.g., advection, dispersion, sorption, and biodegradation) on reducing the actual mass of fuel-related contamination dissolved in groundwater has been termed remediation by natural attenuation (RNA). To estimate the impact of natural attenuation on the fate and transport of BTEX compounds dissolved in groundwater at a site, two important lines of evidence should be demonstrated (Wiedemeier et al., 1995). The first is a documented loss of contaminants at the field scale. One way to show loss of contaminant mass is to use historical monitoring data to show that plume concentrations and extents decrease or remain constant over time. At some sites, dissolved concentrations of biologically recalcitrant tracers found in most fuel contamination can be used in conjunction with aquifer hydrogeologic parameters, such as groundwater seepage velocity and dilution, to demonstrate that a reduction in contaminant mass is occurring. The second line of evidence involves the use of geochemical data in mass-balance calculations to show that areas with BTEX contamination can be correlated to areas with depleted electron acceptor (e.g., oxygen, nitrate, and sulfate) concentrations and increases in metabolic fuel degradation byproduct concentrations (e.g., methane and ferrous iron). With this site-specific information, groundwater flow and solute transport data can be used to estimate the extent of RNA occurring in site groundwater. attenuation of dissolved fuel hydrocarbon contaminants also may be occurring at Site ST-001. The additional time required, if any, for groundwater contamination throughout the plume to be reduced to below cleanup target levels cannot be estimated until the ADEM RBCA procedures and cleanup goals are finalized and additional groundwater data are collected.

SECTION 4

SITE CONFIRMATION SOIL AND GROUNDWATER SAMPLING AND ANALYSIS PLAN

The following SAP describes the sampling locations and procedures, and the analytical methods proposed to collect sufficient data to verify remediation of Site ST-001 soils and groundwater to ADEM cleanup levels, to determine the extent to which natural attenuation processes are reducing contaminant mass in groundwater, and to support site closure. Sampling and laboratory testing will follow the procedures and analytical methods presented in the ADEM (1995) Alabama Underground Storage Tank Release Investigation and Corrective Action Guidance Manual.

As described in Section 2, soil contamination at Site ST-001 was characterized during the 1991 through 1996 investigations. Based on results from these investigations, petroleum hydrocarbon contamination exceeding the ADEM (1995) TRPH CAL of 100 mg/kg (prior to initiation of *in situ* bioventing) appear to have been confined to vadose zone soils between 5 and 25 feet bgs and circumscribed by GMW-1, GMW-2, GMW-3, and GMW-4. To confirm that petroleum hydrocarbon contaminants in site soils have been remediated to within acceptable levels, Parsons ES proposes to drill and sample in the vicinity of the former USTs and within the area of previously identified TRPH CAL exceedances (Figure 2.3).

Groundwater concentrations of benzene, toluene, and ethylbenzene exceeded ADEM (1995) CALs in samples collected in 1991, 1994, and 1996 and exceeded criteria for lead in samples collected in 1991. The maximum downgradient extent of detectable dissolved BTEX contamination was estimated to be approximately 250 feet downgradient from the former USTs (Williams, 1996). To determine any changes in the concentrations of the dissolved BTEX contamination plume, groundwater samples for laboratory analysis will be collected from the three crossgradient or downgradient wells previously demonstrating BTEX contamination (GMW-3, GMW-4, and GMW-44), and from one upgradient well (GMW-45). Groundwater samples from these wells and from wells GMW-1 and GMW-2 will be analyzed for BTEX, PAHs, and lead. Samples from these wells also will be analyzed for VOCs due to their presence in trace amounts during the 1994 sampling conducted by Benchmark Engineering (Table 2.2). In addition, samples from these six wells will be collected and analyzed onsite for various geochemical parameters including electron acceptors. Lastly, groundwater samples from a source area well (GMW-4) and an upgradient well (GMW-45) will be collected for laboratory methane analysis. The geochemical/electron acceptor data will be used to assess whether or not natural biodegradation of BTEX compounds is occurring in the groundwater and to assess the groundwater assimilative capacity for natural chemical attenuation of the remaining concentrations of petroleum hydrocarbon compounds.

4.1 SOIL SAMPLING

This section describes the scope of work required for collecting confirmation soil samples at Site ST-001. An estimated eight boreholes will be drilled and sampled within the area where TRPH results exceeded the ADEM CAL of 100 mg/kg in 1994 and 1995. A maximum of two additional boreholes may be drilled and sampled if field screening results indicate significant contamination extending beyond the proposed sampling area. Proposed borehole locations are shown on Figure 4.1.

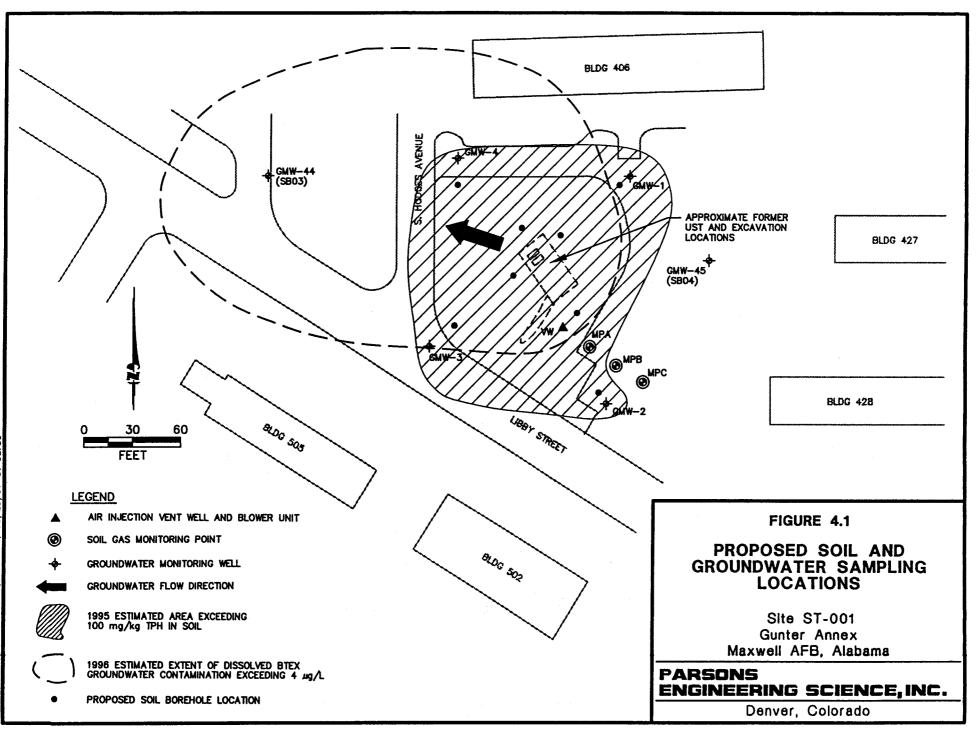
Soil sampling will be conducted by qualified Parsons ES scientists and technicians trained in the conduct of soil sampling, records documentation, and chain-of-custody procedures. In order to provide complete documentation of the sampling event, detailed records will be maintained by the Parsons ES field hydrogeologist. In addition, sampling personnel will have thoroughly reviewed this SAP prior to sample collection and will have a copy available onsite for reference.

4.1.1 Drilling, Sampling, and Equipment Decontamination

Boreholes will be advanced using a drill rig equipped with 2.5- or 3.25-inch insidediameter (ID) hollow-stem augers. Augers and other downhole equipment will be cleaned before use and between boreholes to prevent cross-contamination. Cleaning will be accomplished using a high-pressure, hot-water wash, followed by a potable water rinse. Decontamination will be performed at the site, and decontamination fluids will be discharged on the ground surface adjacent to each borehole. Drill cuttings will be managed as described in Section 4.5. Boreholes not backfilled with clean cuttings will be abandoned using cement/bentonite grout following drilling and sampling. The grout mixture will contain a maximum of 5 percent bentonite.

Boreholes will be drilled to 2 feet below the groundwater table surface; total borehole depths are expected to be between 20 and 27 feet bgs. Relatively undisturbed soil samples, suitable for chemical analysis, will be collected from the ground surface to total depth at approximately 5-foot intervals. Soil types will be classified according to the Unified Soil Classification System (USCS) and described in accordance with the standard Parsons ES soil description format. All soil samples will be visually examined and field analyzed using a photoionization detector (PID) or a total volatile hydrocarbon analyzer (TVHA). Based on field screening results, two samples with the greatest apparent contamination from each boring will be selected and submitted for laboratory analysis of TRPH, PAHs, BTEX, and lead.

Soil samples will be collected in a standard split-barrel sampler that will be lowered through the hollow stem of the augers and driven approximately 1.5 feet ahead of the augers into undisturbed soil. Between sampling events, the split-barrel sampler will be cleaned with Alconox<sup>®</sup> detergent, followed by successive potable and distilled water rinses.



The split-barrel sampler will be fitted with three precleaned, 6-inch-long, thin-walled, brass sleeves. Before samples are collected, sample sleeves will be cleaned using the same procedure as that described for the sampler. After collection of a sample, the sampler will be retrieved, split apart, and the sleeves will be removed. In preparation for laboratory submittal, the ends of the lowest (i.e., deepest) brass sleeve will be covered with Teflon® sheets and plastic end caps.

The upper (i.e., shallower) sample sleeves will be used for geologic logging and will be screened in the field for organic vapors using a PID or a THVA. The data obtained from the logging and screening will be recorded on the borehole logs. The sleeves selected for laboratory analysis will be labeled with the site name and borehole number, sample depth, date of collection, project name, and other pertinent data. These sleeves will be sealed in plastic bags and immediately placed in an insulated cooler containing ice. The soil samples will be maintained in a chilled condition until delivered to the analytical laboratory. Chain-of-custody records will be prepared in the field and will accompany the samples to the analytical laboratory.

4.1.2 Soil Sample Analyses

Proposed soil sample analytical methods, estimated number of samples, and reporting limits are presented in Table 4.1. All samples will be analyzed by a State of Alabama-certified and AFCEE-approved laboratory. Parsons ES proposes to analyze samples from Site ST-001 for TRPH by US Environmental Protection Agency (USEPA) Method SW8015, modified for diesel- and gasoline-range organics; for BTEX by USEPA Method SW8020; for PAHs by USEPA Method SW8310; and for lead by USEPA Method SW7421. Quality control (QC) samples also will be analyzed to assess laboratory methods. The laboratory will perform analyses on one matrix spike, one laboratory control, and one laboratory blank for each specific analytical method requested.

4.2 GROUNDWATER SAMPLING

This section describes the scope of work required for collecting groundwater samples at existing groundwater monitoring wells for both field and laboratory analysis. Samples from six existing wells (GMW-1, GMW-2, GMW-3, GMW-4, GMW-44, and GMW-45) will be sent to the laboratory for BTEX, VOC, PAH, and lead analyses. Samples from these six wells also will be analyzed in the field for electron acceptors and other geochemical parameters to assess the degree of natural chemical attenuation occurring in groundwater at the site. Lastly, samples from two wells, one in the source area (GMW-4) and one upgradient (GMW-45), will be collected for laboratory methane analysis. The proposed groundwater sampling locations are shown on Figure 4.1 and the groundwater analyses to be performed are shown in Table 4.2.

As with soil sampling, groundwater sampling will be conducted by qualified Parsons ES scientists and technicians trained in the conduct of well sampling. Groundwater sampling will be performed in accordance with the procedures outlined in this SAP.

TABLE 4.1 PROPOSED SOIL SAMPLE ANALYTICAL METHODS, REPORTING LIMITS, AND NUMBER OF SAMPLES SITE ST-001

| | | | | Field or | |
|------------------------------|----------------------|---------------------|---------------------|------------|--|
| | Number of | Reporting | | Fixed-Base | |
| Analytical Method | Samples <sup>2</sup> | Limit <sup>b/</sup> | Units <sup>e/</sup> | Laboratory | |
| USEPA Method SW8015 Modified | | | | | |
| Diesel-Range Organics | 16 | 10 | mg/kg | Fixed-base | |
| Gasoline-Range Organics | 16 | 1 | mg/kg | Fixed-base | |
| USEPA Method SW8020 | | | | | |
| Benzene | 16 | 1.0 | μg/kg | Fixed-base | |
| Toluene | 16 | 2.0 | μg/kg | Fixed-base | |
| Ethylbenzene | 16 | 2.0 | μg/kg | Fixed-base | |
| Xylenes | 16 | 2.0 | μg/kg | Fixed-base | |
| USEPA Method SW8310 | | | | | |
| Acenapthene | 16 | 1,200 | μg/kg | Fixed-base | |
| Acenaphthylene | 16 | 1,540 | μg/kg | Fixed-base | |
| Anthracene | 16 | 440 | μg/kg | Fixed-base | |
| Benzo(a)anthracene | 16 | 9 | μg/kg | Fixed-base | |
| Benzo(a)pyrene | 16 | 15 | μg/kg | Fixed-base | |
| Benzo(a)fluoranthene | 16 | 12 | μg/kg | Fixed-base | |
| Benzo(g,h,i)perylene | 16 | 50 | μg/kg | Fixed-base | |
| Benzo(k)fluoranthene | 16 | 11 | μg/kg | Fixed-base | |
| Chrysene | 16 | 100 | μg/kg | Fixed-base | |
| Dibenzo(a,h)anthracene | 16 | 20 | μg/kg | Fixed-base | |
| Fluoranthene | 16 | 140 | μg/kg | Fixed-base | |
| Fluorene | 16 | 140 | μg/kg | Fixed-base | |
| Indeno(1,2,3-cd)pyrene | 16 | 30 | μg/kg | Fixed-base | |
| Naphthalene | 16 | 1,200 | μg/kg | Fixed-base | |
| Phenanthrene | 16 | 420 | μg/kg | Fixed-base | |
| Pyrene | 16 | 180 | μg/kg | Fixed-base | |
| USEPA Method SW7421 | | | | | |
| Lead | 16 | 500 | μg/kg | Fixed-base | |

Excludes QC samples. If optional boreholes are required, two additional soil samples per optional borehole also will be collected and analyzed.

Project reporting limit as specified in subcontract for analytical services.

<sup>&</sup>quot; mg/kg = milligrams per kilogram; μg/kg = micrograms per kilogram.

TABLE 4.2 PROPOSED GROUNDWATER SAMPLE ANALYTICAL METHODS, REPORTING LIMITS, AND NUMBER OF SAMPLES

SITE ST-001

| | | | | Field or |
|------------------------------------|------------|-----------|--------------------|------------|
| | Number of | Reporting | | Fixed-Base |
| Analytical Method | Samples* | Limitb | Units <sup>o</sup> | Laboratory |
| USEPA Method SW8260A | | | | |
| 1,1,1,2-Tetrachloroethane | 6 | 0.5 | μg/L | Fixed-base |
| 1,1,1-Trichloroethane | 6 | 0.8 | μg/L | Fixed-base |
| 1,1,2,2-Tetrachloroethane | 6 | 0.4 | μg/L
μg/L | Fixed-base |
| 1,1,2-Trichloroethane | 6 | 1.0 | μg/L | Fixed-base |
| 1,1-Dichloroethane | 6 | 0.4 | μg/L | Fixed-base |
| 1,1-Dichloroethene | 6 | 1.2 | μg/L | Fixed-base |
| 1,1-Dichloropropene | 6 | 1.0 | μg/L | Fixed-base |
| 1,2,3-Trichlorobenzene | 6 | 0.3 | μg/L
μg/L | Fixed-base |
| 1,2,3-Trichloropropane | 6 | 3.2 | μg/L | Fixed-base |
| 1,2,4-Trichlorobenzene | 6 | 0.4 | μg/L | Fixed-base |
| 1,2,4-Trimethylbenzene | 6 | 1.3 | μg/L | Fixed-base |
| 1,2-Dibromo-3-chloropropane (DBCP) | 6 | 2.6 | μg/L | Fixed-base |
| 1,2-Dibromoethane (EDB) | 6 | 0.6 | μg/L | Fixed-base |
| 1,2-Dichlorobenzene | 6 | 0.3 | μg/L | Fixed-base |
| 1,2-Dichloroethane | 6 . | 0.6 | μg/L | Fixed-base |
| 1,2-Dichloropropane | 6 | 0.4 | μg/L | Fixed-base |
| 1,3,5-Trimethylbenzene | 6. | 0.5 | μg/L | Fixed-base |
| 1,3-Dichlorobenzene | 6 | 1.2 | μg/L | Fixed-base |
| 1,3-Dichloropropane | 6 | 0.4 | μg/L | Fixed-base |
| 1,4-Dichlorobenzene | 6 | 0.3 | μg/L | Fixed-base |
| 1-Chlorohexane | 6 | 0.5 | μg/L | Fixed-base |
| 2,2-Dichloropropane | 6 | 3.5 | μg/L | Fixed-base |
| 2-Chlorotoluene | 6 | 0.4 | μg/L | Fixed-base |
| 4-Chlorotoluene | 6 | 0.6 | μg/L | Fixed-base |
| Benzene | 6 | 0.4 | μg/L | Fixed-base |
| Bromobenzene | 6 | 0.3 | μg/L | Fixed-base |
| Bromochloromethane | 6 | 0.4 | μg/L | Fixed-base |
| Bromodichloromethane | 6 | 0.8 | μg/L | Fixed-base |
| Bromoform | 6 | 1.2 | μg/L | Fixed-base |
| Bromomethane | 6 | 1.1 | μg/L | Fixed-base |
| Carbon tetrachloride | 6 | 2.1 | μg/L | Fixed-base |
| Chlorobenzene | 6 . | 0.4 | μg/L | Fixed-base |
| Chloroethane | 6 | 1.0 | μg/L | Fixed-base |

TABLE 4.2 (Continued) PROPOSED GROUNDWATER SAMPLE ANALYTICAL METHODS, REPORTING LIMITS, AND NUMBER OF SAMPLES

SITE ST-001

| | · | | | Field or |
|----------------------------------|-----------|-----------------|--------------------|------------|
| | Number of | Reporting | | Fixed-Base |
| Analytical Method | Samples* | Limitb | Units <sup>c</sup> | Laboratory |
| USEPA Method SW8260A (Continued) | | | | |
| Chloroform | 6 | 0.3 | μg/L | Fixed-base |
| Chloromethane | 6 | 1.3 | μg/L | Fixed-base |
| cis-1,2-Dichloroethene | 6 | 1.2 | μg/L | Fixed-base |
| cis-1,3-Dichloropropene | 6 | NA <sup>d</sup> | NA | Fixed-base |
| Dibromochloromethane | 6 | 0.5 | μg/L | Fixed-base |
| Dibromomethane | 6 | 2.4 | μg/L | Fixed-base |
| Dichlorodifluoromethane | 6 | 1.0 | μ g/ L | Fixed-base |
| Ethylbenzene | 6 | 0.6 | μ g/ L | Fixed-base |
| Hexachlorobutadiene | 6 | 1.1 | μ g/ L | Fixed-base |
| Isopropylbenzene | 6 | 0.5 | μ g/ L | Fixed-base |
| m-Xylene | 6 | 0.5 | μ g/ L | Fixed-base |
| Methylene Chloride | 6 | 0.3 | μg/L | Fixed-base |
| n-Butylbenzene | 6 | 1.1 | μ g/ L | Fixed-base |
| n-Propylbenzene | 6 | 0.4 | μ g/ L | Fixed-base |
| Naphthalene | 6 | 0.4 | μg/L | Fixed-base |
| o-Xylene | 6 | 1.1 | μg/L | Fixed-base |
| p-Isopropyltoluene | 6 | 1.2 | μg/L | Fixed-base |
| p-Xylene | 6 | 1.3 | μg/L | Fixed-base |
| sec-Butylbenzene | 6 | 1.3 | μg/L | Fixed-base |
| Styrene | 6 | 0.4 | μg/L | Fixed-base |
| tert-Butylbenzene | 6 | 1.4 | μg/L | Fixed-base |
| Tetrachloroethene | 6 | 1.4 | μg/L | Fixed-base |
| Toluene | 6 | 1.1 | μg/L | Fixed-base |
| trans-1,2-Dichloroethene | 6 | 0.6 | μ g/ L | Fixed-base |
| trans-1,3-Dichloropropene | 6 | NA | · NA | Fixed-base |
| Trichloroethene | 6 | 1.0 | μg/L | Fixed-base |
| Trichlorofluoromethane | 6 | 0.8 | μg/L | Fixed-base |
| Vinyl chloride | 6 | 1.1 | μg/L | Fixed-base |
| USEPA Method SW8310 | | | | |
| Acenaphthene | 6 | 18 | μg/L | Fixed-base |
| Acenaphthylene | 6 | 23 | μg/L | Fixed-base |
| Anthracene | 6 | 6.6 | μg/L | Fixed-base |

TABLE 4.2 (Continued) PROPOSED GROUNDWATER SAMPLE ANALYTICAL METHODS, REPORTING LIMITS, AND NUMBER OF SAMPLES

SITE ST-001

| | Number of | Reporting | | Field or
Fixed-Base |
|---------------------------------|-----------|--------------------|--------------------|------------------------|
| Analytical Method | Samples d | Limit <sup>b</sup> | Units <sup>c</sup> | Laboratory |
| USEPA Method SW8310 (Continued) | | | | |
| Benzo(a)anthracene | 6 | 0.1° | μg/L | Fixed-base |
| Benzo(a)pyrene | 6 | 0.2° | μg/L | Fixed-base |
| Benzo(b)fluoranthene | 6 | 0.18 | μg/L | Fixed-base |
| Benzo(g,h,i)perylene | 6 | 0.76 | μg/L | Fixed-base |
| Benzo(k)fluoranthene | 6 | 0.17 | μ g/ L | Fixed-base |
| Chrysene | 6 | 0.2° | μ g/ L | Fixed-base |
| Dibenzo(a,h)anthracene | 6 | 0.3 | μ g/ L | Fixed-base |
| Fluoranthene | 6 | 2:1 | μg/L | Fixed-base |
| Fluorene | 6 | 2.1 | μg/L | Fixed-base |
| Indeno(1,2,3-cd)pyrene | 6 | 0.4* | μg/L | Fixed-base |
| Naphthalene | 6 | 18 | μ g/L | Fixed-base |
| Phenanthrene | 6 | 6.4 | μ g/ L | Fixed-base |
| Pyrene | 6 | 2.7 | μg/L | Fixed-base |
| USEPA Method SW7421 | | | | : |
| Lead | 6 | 5 , | μg/L | Fixed-base |
| USEPA SW9056 | | | | |
| Sulfate | 6 | 0.2 | mg/L | Fixed-base |
| RSKSOP 175 <sup>®</sup> | | | | |
| Methane | 2 | NA | NA | Fixed-base |
| Hach Method 8000 Series® | | | | |
| Nitrate | 6 | *** | | Field |
| Nitrite | 6 | | | Field |
| Sulfide | 6 | | *** | Field |
| Ferrous Iron | 6 | | *** | Field |
| Manganese | 6 | | | Field |

TABLE 4.2 (Continued) PROPOSED GROUNDWATER SAMPLE ANALYTICAL METHODS, REPORTING LIMITS, AND NUMBER OF SAMPLES SITE ST-001

| Analytical Method | Number of
Samples <sup>w</sup> | Reporting Limit <sup>b'</sup> | Units <sup>e/</sup> | Field or
Fixed-Base
Laboratory |
|----------------------|-----------------------------------|-------------------------------|---------------------|--------------------------------------|
| Direct Reading Meter | | | | |
| pН | 6 | | | Field |
| Conductivity | 6 | | | Field |
| Temperature | 6 | | *** | Field |
| Dissolved Oxygen | 6 | | | Field |
| Redox Potential | 6 | *** | | Field |

<sup>&</sup>quot;Excludes QC samples.

Project reporting limit as specified in subcontract for analytical services.

d μg/L = micrograms per liter; mg/L = milligrams per liter.

NA = not available.

<sup>&</sup>quot;Number shown represents proposed or actual Federal maximum contaminant level (MCL) for groundwater. Laboratory reporting limits for these and all other analytes will be less than or equal to MCLs.

<sup>&</sup>lt;sup>9</sup> National Risk Management Research Laboratory (formerly Robert S. Kerr Research Laboratory) Standard Operating Procedure for methane or equivalent.

<sup>&</sup>lt;sup>8'</sup>"Hach" refers to methods described in the Hach Company catalog, 1990.

4.2.1 Well Purging, Sample Collection, and Decontamination

This section describes the scope of work required for collecting groundwater samples at each of six existing groundwater monitoring wells. All water samples collected from groundwater monitoring wells will be obtained using either disposable bailers, decontaminated Teflon® bailers, or a thoroughly decontaminated peristaltic pump. In order to maintain a high degree of QC during this sampling event, the procedures described in the following sections will be followed.

4.2.1.1 Equipment Decontamination

All portions of sampling and test equipment that will contact the sample will be thoroughly cleaned before each use. This equipment includes the peristaltic pump and tubing, Teflon® bailers, water-level probe and cable, oil/water interface probe and cable, lifting line, test equipment for onsite use, and other equipment or portions thereof which will contact the samples. Based on the types of sample analyses to be conducted, the following decontamination protocol will be used:

- Clean with potable water and phosphate-free laboratory detergent;
- Rinse with potable water;
- Triple rinse with distilled or deionized water;
- · Air dry the equipment prior to use.

If precleaned, dedicated sampling equipment is used, the decontamination protocol specified above will not be required. Laboratory-supplied sample containers will be cleaned and sealed by the laboratory.

4.2.1.2 Well Purging

Prior to removing any water from the well, the static water level will be measured. An electrical water level probe will be used to measure the depth to groundwater below the datum to the nearest 0.01 foot. After measuring the static water level, the water level probe will be lowered slowly to the bottom of the well, and the total well depth will be measured to the nearest 0.01 foot. Based on these measurements, the volume of water to be purged from the well can be calculated. The volume of water contained within the well casing at the time of sampling will be calculated, and three times the calculated volume will be removed from the well. The pH, temperature, and specific conductivity will be monitored before, during, and after well purging and recorded on well sampling forms. Purge water will be discharged onto the ground surface adjacent to the well from which it was removed.

4.2.1.3 Sample Extraction

Either disposable, polyethylene bailers, reusable Teflon<sup>®</sup> bailers, or a thoroughly decontaminated peristaltic pump will be used to extract groundwater samples from the

well. The extraction equipment will be lowered into the water gently to prevent splashing and extracted gently to prevent creation of excessive vacuum in the well. The sample will be transferred directly to the appropriate sample container. The water sample will be transferred from the bottom of the bailer using a bottom-emptying device to allow a controlled flow into the sample container. Water from the peristaltic pump can be directly discharged into the sample container. The water will be carefully poured down the inner walls of the sample bottle to minimize aeration of the sample. Unless other instructions are given by the analytical laboratory, sample containers will be completely filled so that no air space remains in the container.

4.2.2 Onsite Chemical Parameter Measurement

Many of the groundwater chemical parameters will be measured onsite by Parsons ES personnel (Table 4.2). Some of the measurements will be made using direct-reading meters, while others will be made using a Hach® portable colorimeter in accordance with specific Hach® analytical procedures. These procedures are described in the following subsections.

All glassware or plasticware used in the analyses will have been cleaned prior to sample collection by thoroughly washing with a solution of Alconox and water, and rinsing with deionized water and ethanol to prevent interference or cross contamination between measurements. If concentrations of an analyte are above the range detectable by the titrimetric method, the analysis will be repeated by diluting the groundwater sample with double-distilled water until the analyte concentration falls to a level within the range of the method. All rinseate and sample reagents accumulated during field groundwater analysis will be discharged onto the ground surface at the site. Sample reagents to be used for field analysis are composed of innocuous salts and only a few grams of the reagents will be required.

4.2.2.1 Dissolved Oxygen Measurements

Dissolved oxygen (DO) is an important electron acceptor in the aerobic biodegradation of dissolved fuel hydrocarbons. DO measurements will be made using a meter with a downhole oxygen sensor or a sensor in a flow-through cell. Measurements will be taken before and following groundwater sample acquisition. When DO measurements are taken in monitoring wells that have not yet been sampled, the existing monitoring wells will be purged until DO levels stabilize. Measured values will be recorded in the groundwater sampling record.

4.2.2.2 pH, Temperature, and Specific Conductance

Because the pH, temperature, and specific conductance of a groundwater sample can change significantly within a short time following sample acquisition, these parameters will be measured in the field in unfiltered, unpreserved, "fresh" water collected by the same technique as the samples taken for laboratory analyses. The measurements will be made in a clean glass container separate from those intended for laboratory analysis, and the measured values will be recorded in the groundwater sampling record.

4.2.2.3 Other Electron Acceptor Measurements

Nitrate, nitrite, sulfate, and ferrous iron concentrations in groundwater act as potential electron acceptors for fuel hydrocarbon degradation under anaerobic conditions. These analytes will be measured by experienced Parsons ES scientists via colorimetric analysis using a Hach® portable colorimeter according to the appropriate Hach® methods (Table 4.2).

4.2.2.4 Reduction/Oxidation Potential

The oxidation/reduction (redox) potential of groundwater is an indicator of the relative tendency of a solution to accept or transfer electrons. Redox reactions in groundwater often are biologically mediated; therefore, the redox potential of a groundwater system depends upon and influences rates of biodegradation. Redox potentials can be used to provide real-time data on the location of the contaminant plume, especially in areas undergoing anaerobic biodegradation. The redox potential of a groundwater sample can change significantly within a short time following sample acquisition and exposure to atmospheric oxygen. Therefore, this parameter will be measured in the field in unfiltered, unpreserved, "fresh" water collected by the same technique as the samples taken for laboratory analyses. The measurements will be made as quickly as possible in a clean glass container separate from those intended for laboratory analysis.

4.2.3 Sample Handling

Sample containers and appropriate container lids will be provided by the laboratory. The laboratory will add any necessary chemical preservatives prior to shipping the containers to the site. The sample containers will be filled as described in Section 4.2.1.3, and the container lids will be tightly closed. The sample bottles will be labeled with the site name and well number, sample depth, date of collection, project name, and other pertinent data. Samples will be properly prepared for transportation to the laboratory by placing the samples in a cooler containing ice to maintain a shipping temperature of approximately 4 degrees centigrade (°C). Chain-of-custody records will be prepared in the field and will accompany the samples to the analytical laboratory.

4.2.4 Groundwater Analyses

Proposed groundwater sample analytical methods and laboratory reporting limits are presented in Table 4.2. All samples will be analyzed by a State of Alabama-certified and AFCEE-approved laboratory. Parsons ES proposes to analyze groundwater samples from Site ST-001 for BTEX and VOCs by USEPA Method SW8260; for PAHs by USEPA Method SW8310; for lead by USEPA Method SW7421; for sulfate by USEPA Method SW9056; and for methane by Robert S. Kerr Standard Operating Procedure (RSKSOP) 175 or equivalent. QC samples also will be analyzed to assess laboratory methods. The laboratory will perform analyses on one matrix spike, one laboratory control, and one laboratory blank for each specific analysis requested.

4.3 CHAIN-OF-CUSTODY CONTROL

After the samples for laboratory analysis have been collected, chain-of-custody procedures will be followed to establish a written record of sample handling and movement between the sampling site and the laboratory. Samples collected for onsite field analyses will not require chains-of-custody. Each shipping container will have a chain-of-custody form completed in triplicate by the sampling personnel. One copy of this form will be kept by the sampling contractor after sample delivery to the analytical laboratory, and the other two copies will be retained at the laboratory. One of the laboratory copies will become a part of the permanent record for the sample and will be returned with the sample analytical results. The chain-of-custody will contain the following information:

- Site name and address;
- Sample identification number;
- Sample collector's printed name and signature;
- Date and time of collection;
- Place and address of collection:
- Type of sample, i.e. composite, grab, etc.;
- Sample matrix (soil or groundwater);
- Chemical preservatives added;
- Analytical laboratory to be utilized;
- Analyses requested;
- Signatures of individuals involved in the chain of possession; and
- Inclusive dates of possession.

The chain-of-custody documentation will be placed inside the shipping container so that it will be immediately apparent to the laboratory personnel receiving the container, but will not be damaged or lost during transport. The shipping container will be sealed so that it will be obvious if the seal has been tampered with or broken.

4.4 QUALITY ASSURANCE/QUALITY CONTROL PROCEDURES

Samples must be collected, preserved, transported, and analyzed in such a manner that sampling results yield information which provides a reliable representation of the soil and groundwater quality at the site. To meet this requirement, the procedures described in Sections 4.1 and 4.2 will be followed during sample collection, handling and analysis. In addition, laboratory QC samples will be analyzed as described in Sections 4.1.2 and 4.2.4.

Field QA/QC for groundwater and soil will include collection of field duplicates, rinseate blanks, and trip blanks. Groundwater QA/QC sampling will include one duplicate sample (minimum frequency of 10 percent), one rinseate blank, and one trip blank for each cooler with samples designated for VOC analysis. Soil QA/QC sampling will include two duplicates (minimum frequency of 10 percent), one rinseate blank, and one trip blank for each cooler with samples designated for VOC analysis.

4.5 MANAGEMENT OF INVESTIGATION-DERIVED WASTES

Soil cuttings generated during drilling will be screened with a PID or a TVHA. Those cuttings that exhibit staining, odor, or headspace readings above background levels will be placed in US Department of Transportation (DOT)-approved 55-gallon drums. The drums will be labeled with the site name, drilling date, borehole number, and depth intervals. The contaminated soil will be transported to the Maxwell AFB contaminated soil staging area and will be disposed of in accordance with the current procedures for ongoing remedial investigations at Maxwell AFB and Gunter Annex. To minimize cuttings disposal costs, cuttings showing no field evidence of contamination will either be replaced into the borehole from which they were generated or spread on the ground surface adjacent to each borehole.

SITE CONFIRMATION SAMPLING REPORT FORMAT

Following receipt of the laboratory analytical results, a draft confirmation soil and groundwater sampling report will be prepared and submitted to ADEM, Maxwell AFB, and AFCEE.

The report will contain the following information for Site ST-001:

- Site plot plan showing sampling locations;
- Summary of field activities;
- Assessment of analytical results in comparison to applicable ADEM soil cleanup criteria for petroleum hydrocarbons, PAHs, lead, and BTEX;
- Assessment of analytical results in comparison to applicable ADEM groundwater cleanup criteria for PAHs, VOCs, lead, and BTEX;
- Assessment of the potential for RNA in groundwater;
- Evaluation of the applicability and anticipated effectiveness of using a bioattenuation stimulant (i.e., oxygen release compound) to promote RNA aerobic degradation pathways;
- ADEM required information including ADEM site classification and groundwater monitoring forms, site-specific monitoring well elevation data (based on area benchmarks or topographic maps), and depth to groundwater (referenced to the tops of monitoring well casings or ground level);
- Laboratory analytical reports and chain-of-custody forms;
- Borehole logs; and
- Conclusions and recommendations for NFRAP and site closure, additional cleanup action, or continued groundwater monitoring.

MAXWELL AFB SUPPORT REQUIREMENTS

The following Maxwell AFB support is needed prior to the arrival of the drillers and the Parsons ES team:

- Assistance in obtaining drilling and digging permits.
- Arrangement of Gunter Annex and site access for Parsons ES and the drilling subcontractor.
- Provision of a potable water supply for drilling and decontamination activities.
- Assistance in handling/disposal of contaminated soil cuttings, if encountered during drilling activities, in accordance with Section 4.5.

PROJECT SCHEDULE

The following schedule is contingent upon approval of this confirmation SAP and fulfillment of the Maxwell AFB support requirements outlined in Section 6.

| Event | Date |
|---|-------------------|
| Submit Draft Confirmation SAP to AFCEE, and Maxwell AFB | 28 March 1997 |
| Receipt of AFCEE and Maxwell AFB Comments | 8 April 1997 |
| Submit Draft Final SAP to AFCEE, Maxwell AFB, and ADEM* | 9 May 1997 |
| Receipt of AFCEE, Maxwell AFB, and ADEM Comments, if any | 6 June 1997 |
| Submit Final SAP to AFCEE, Maxwell AFB, and ADEM, if necessary* | 20 June 1997 |
| Begin Confirmation Sampling | 7 July 1997 |
| Submit Draft Confirmation Sampling Report to AFCEE and Maxwell AFB | 12 September 1997 |
| Receipt of AFCEE and Maxwell AFB Comments | 3 October 1997 |
| Submit Draft Final Confirmation Sampling Report to AFCEE, Maxwell AFB, and ADEM | 24 October 1997 |

<sup>\*</sup> Copies of SAP for ADEM sent to Maxwell AFB for submittal.

POINTS OF CONTACT

Mr. James Rumbly 42nd CES/CEVR 400 Cannon Street Maxwell AFB, AL 36112-6523 DSN 493-3896 COM (334) 953-3896 Fax: (334) 953-5765

Mr. Justin Martindale/Mr. Timothy Young ADEM

<u>Street Address:</u>
1751 Cong. W.L. Dickinson Drive
Montgomery, AL 36109-2608

<u>Mailing Address:</u>
P.O. Box 301463

Montgomery, AL 36130-1463
(334) 270-5603

Fax: (334) 270-5612

Major Ed Marchand AFCEE/ERT 3207 North Rd, Bldg. 532 Brooks AFB, TX 78235-5363 DSN 240-4364 COM (210) 536-4364 Fax: (210) 536-4330 Mr. John Hall Parsons Engineering Science, Inc. 257 A 28 Road Grand Junction, CO 81503 (970) 244-8829 Fax: (970) 244-8829

Mr. John Ratz
Parsons Engineering Science, Inc.
1700 Broadway, Suite 900
Denver, CO 80290
(303) 831-8100
Fax: (303) 831-8208

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- Williams Engineering, Inc., 1996. Groundwater Sampling Results, Former Building 408, Gunter Annex. September.

APPENDIX B
BORING LOGS, GROUNDWATER SAMPLING FORMS

| BORING NO. | SRUI | CONTRACTOR: | CCI | | 7/8/97 09:15 |
|------------|-----------|---------------------|------|------------|---------------------------------------|
| CLIENT: | AFCEE | RIG TYPE: | CME | DATE CMPL: | 7/8/97 |
| | 726876.20 | 1/20 DRLG METHOD: | HSA | ELEVATION: | MA |
| | | ST-00/ BORING DIA.: | 4.5" | TEMP.: | 85-90°F |
| GEOLOGIST: | | DRLG FLUID | | WEATHER: | P. Sunny |
| COMMENTS: | | | | | · · · · · · · · · · · · · · · · · · · |

| COMME | | | | | | | | | |
|----------|----------|--------------|------|-------------------------------|--------------|--------------|--------------|------------------|----------------------------|
| Elev. | Depth | Pro- | US | | Sar | nples | Sample | Penet. | Remarks |
| (ft.) | (ft.) | file | CS | Geologic Description | | | Турс | Res. | TIP = Bkgrnd/Reading (ppm) |
| (/ | 1 | | | CLAY, silty, brn., maist, tr | | | | 346 | 08/14 |
| | <u> </u> | | 1 CL | Cont, silly , ork., maist, it | | | | :/16 | /// |
| | | | | sand no odor | | 1 | | | |
| | | | | | | | | | |
| | | | 1 | · | | | | | |
| | 5 | | | SAA | | 1. | , | 3/4/6 | 0.0 |
| | - | | 4 | | 1 | 4-6 | D | 16 | |
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|] | | 1 | | | 1 | 1 | | 1 | |
| ļ · | 10 | 1 | 1 | | Lab | | | 1/2/ | 10.0 |
| | 10 | | | CANA I C | 09:20 | 9-11 | D | 4/7/4/ | |
| 1 | | 1 | SM | SAND, SM. Silt, fin-grained | - | | | 14 | |
| 1 | |] | | grey/red no advr | 1 | | ļ | | |
| 1 | | | l | • | 1 | 1 | | 1 | |
| | | 1 | 1 | | 1 | | | | |
| | 15 | | 10 | CIAY -14 -1 14-145' | | | | 34 | 10.0 |
| | 13 | \ _ | 100 | CLAY, silty, moist 14-14.5' | - | 14-16 | D | 3489 | ,,,,,, |
| | | 4 | SM | SAND, md-coarse, tr-sm gravel | | <u> </u> | | +-7 | |
| 1 | | | 1 | tan, moist no octor | <u>.</u> | 1 | ł | | • |
| 1 | | 7 | 1 | | | 1 | 1 | | |
| 1 | | 1 | i | | 7 | 1 | 1 | 1 | • |
| | - | - | 1000 | CAA 1 - 211 | Lab | | | 3578 | 10.0 |
| | 20 | 4 | | SAA wet@ 21' more grant | 09:30 | 19-2 | D | 17, | , 10,0 |
| 1 | | _ | SW | | 07.30 | | | ' | |
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| 1 | | ┪ | | | 7 | 1 | 1 | İ | |
| | - | | + | | | | + | 369 | 0.2 |
| | 25 | 4 | CL | CLAY, silty, gray, v. moist | _} | 1. | リシ | 9 | 0.2 |
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SAMPLE TYPE f - fine si - slight v - very D - DRIVE Core recovery tr - trace lt - light m - medium C - CORE c - coarse dk - dark sm - some G - GRAB Core lost BH - Bore Hole bf - buff - and brn – brown SAA - Same As Above Water level drilled blk - black - with

| | | | 32 _ |
|-------------------------------|--------------|------|--------------------------|
| BORING NO. 58-02 - | CONTRACTOR: | CCI | DATE SPUD: 7/8/4 7 09:50 |
| CLIENT: AFCEE | RIG TYPE: | CME | DATE CMPL: 7/8/97 |
| JOB NO.: 726876. 24120 | DRLG METHOD: | HSA | ELEVATION: — |
| LOCATION: Gunter Annex ST-001 | BORING DIA.: | 4.5" | TEMP.: 85-90'F |
| GEOLOGIST: J. Hall | DRLG FLUID | | WEATHER: P.SUNNY |
| COMMENTS: | _ | | - |

| | Depth | | US | | Sa | mples | Sample | Penet. | Remarks |
|---------------------------------------|----------|------|----------|------------------------------|--|--------------|--------------|----------------|----------------------------|
| (fL.) | (ft.) | file | CS | Geologic Description | | Depth (ft) | | Rcs. | TIP = Bkgrmd/Reading (ppm) |
| | 1 | | CL | CLAY, silty, red/brn, mist | 1 | 0.5 | | | 0.0 |
| | | | | no oder | | | | | |
| | | | | | 1 | | | | |
| | | | <u> </u> | | 7 | | | | |
| | 5 | | | | 1 | | | | |
| | | | | SAA | 1 | 5-7 | | 12 | 0.2 |
| | | | 4P | SAND & GRAVEL, white forange | 1 | J - F | D | 18 | |
| | | | 47 | moist (Fill?) | 1 | | | | |
| | | | • | | 1 | 1 | | | |
| | 10 | | | | - | | | | |
| | | | | SAA (Fill?) | | 10-12 | | 18 54 | |
| | | 1 | | SHP (FILL) | -{ | 10-12 | D | 54 | 0.0 |
| | | | | | | | | + | |
| | | | | | | j | | | |
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| · · · · · · · · · · · · · · · · · · · | 15 | | | | 406 | | | | |
| | | | | SAA | 1 | 15-17 | D | 73, | 0.0 |
| | | | ł | · | 10:05 | <u> </u> | | | |
| | <u> </u> | 1 | 1 | | _ | 1 | | | |
| | <u> </u> | ļ | | | _ | ł | | | |
| | 20 |] | 1 | SAA orange @ 21' | | | | | |
| | L | | | wote 21' no oder | Lab | 20-22 | ۵ | 59 | 0.2 |
| | |] | | | 10:10 | | 10 | 5q
10
12 | |
| | | } | | CLAY, silty, grey, wet | | 22-24 | 1 | 1133 | · |
| | | 1 | CL | ne odor | 7 | 77.74 | D | 34 | 0.1 |
| | 25 | | 1 | TD | | 1 | † | 1 | |
| | 1 | 1 | 1 | | 1 | 1 | | | |
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al - slight

v - very

f - fine

SAMPLE TYPE

tr - trace

lt - light

m - medium

D - DRIVE

C Core recovery

sm - some

dk - dark bf - buff c - coarse BH - Bore Hole C - CORE G - GRAB

Core lost

- at w - with

brn – brown blk – black SAA - Same As Above

| BORING NO. <u>\$803</u> | CONTRACTOR: | CCI | DATE SPUD: | 7/8/97 | 11:15 |
|-------------------------------|--------------|------|------------|---------|-------------|
| | RIG TYPE: | CME | DATE CMPL: | 7/8/97 | |
| | DRLG METHOD: | HSA | ELEVATION: | | |
| LOCATION: Gunter Annex ST-00/ | BORING DIA.: | 4.5" | TEMP.: | 90°F | |
| | DRLG FLUID | | WEATHER: | P.Sunny | |
| COMMENTS: | | , | _ | | |

| Elev. | Depth | Pro- | US | | Sau | mples | Sample | Penet. | Remarks |
|-------|-------|--|--------------|----------------------------------|-------|--------------|----------|----------------|--|
| (ft.) | (ft.) | file | CS | Geologic Description | | Depth (ft) | | | TIP = Bkgrnd/Reading (ppm) |
| | 1 | | CL | CLAY, silty, red/brn, moist | | 0-5 | | | |
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| | **** | | | | | | , | | |
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| ļ | 5 | | | | | | | | |
| | ~ | | CL | SAA, tr. gravel | | | | 2 <sub>2</sub> | 0.0 |
| ŀ | | | CL | Siii, Ir. gravei | | 5-7 | D | 3, | 0,0 |
| ŀ | | | | | | | | | |
| } | | | | | | | | | <u></u> |
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| | 10 | | | | | | | | |
| Į | | | ML | SILT, tr clay tr u.f. sand gray- | | 10-12 | D | 684 | 2.0 |
| 1 | | | | red-orange moist | | <u> </u> | <u> </u> | 18 | |
| | | | l | | | ł | | | |
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| Ì | 15 | | | | | | 1 | Ì | |
| | | | Sp- | SAND, f-u.f., tr. silt, mist | Lab | | | 5667 | 2,0 |
| | | | SM | It grey | 11:25 | 11 5 -17 | D | 6, | |
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| | ļ | 1 | GP | | Lab | 20-22 | 0 | 12 | 4.0 |
| | | 1 | 1 | wete 21 , orange @ 21.5 | 11:35 | | 1 | 10,12 | |
| | | 1 | 1 | SAA wet greystain | Lab | 22.24 | 10 | 9912 | 400 |
| | |] | | sl. oder | 12:00 | 1 | 12 | 3 | |
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| sl - slight | v -very | f - fine | SAMPLE TYPE | |
|-------------|-------------|---------------------|-------------|---------------|
| tr - trace | lt – light | m - medium | D - DRIVE C | Core recovery |
| sm - some | dk - dark | c - coarse | C - CORE | |
| & - and | bf -buff | BH - Bore Hole | G – GRAB | Core lost |
| @ - et | brn – brown | SAA - Same As Above | | |
| w - with | blk – black | | Water level | drilled |

| $\alpha \alpha \cdot \lambda$ | TOO DO NOT LOO | |
|---|----------------|------------------------------|
| BORING NO. SBO4 - CON CLIENT: AFCEE | TRACTOR: CCI | _ DATE SPUD: 7/8/97 |
| IOP NO TOUR TOUR TOUR TOUR TOUR TOUR TOUR TOU | TYPE: CME | DATE CMPL: 7/8/97 |
| LOCATION: Gunter Annex ST-001 BORD | G METHOD: DCN | ELEVATION: |
| GEOLOGIST: J. Hall DRL | G FLUID | TEMP.: Qo'F WEATHER: D.Sunny |
| COMMENTS: | | - plaukky |

| (ft.) | Depth
(ft.) | Pro-
file | US | Carlott D. Lat | | mples | Sample | Penet. | Remarks |
|----------|----------------|--------------|------|---|-------|------------|-----------------|--------|---------------------------|
| (464) | | 1770 | | Geologic Description | No. | Depth (ft) | Турс | Rcs. | TIP = Bkgrn4/Reading (ppu |
| | 1 | | ML | SILT, clayer, brn., moist | | 0-5 | | | |
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| | 5 | | ĺ | | | | | | |
| | | | | SILT, SM. clay & f. sand, gray/rol/ | | - | | | |
| | | | | arange anist | | 5-7 | D | | 3.0 |
| | | | | orange, moist | | | | | |
| | | | | | | | | | |
| | 10 | | | | | | | | |
| | | | 14.7 | | | | | | |
| | | | ML- | SILT + CLAY, gray/rod/ovarge moist, sl. odor-musty/fuel | Lab | 10-12 | 6 | 99 | 4,000 |
| | | | CL | Moist, sl. odor-musty/fuel | 12:05 | • • | D | 10 | · |
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| | | | SP | SAND, It gray, moist sludor | | | | 6667 | 0.0 |
| | | | 3' | 11 July 12 51 0005F | | 15-17 | 0 | 6 | 20 |
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| } | | | 40 | SAND I GRAVEZ, White, | | 20-22 | * | 1199 | 2.0 |
|] | | | | V. moist, u.sl. odor, pror recovery | | 000 | 2 | 19 | |
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| | | | | SAA, wet | | 22.24 | $ \mathcal{D} $ | 4878 | |
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tr - trace lt - light m - medium D - DRIVE C Core recovery dk - dark sm - some c - coarse C - CORE bf - buff - and BH - Bore Hole G-GRAB Core lost brn – brown SAA - Same As Above - with blk - black Water level drilled

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|--------------------|--------------|---|--------------------------|
| BORING NO. SSO5 - | CONTRACTOR: | CCI | DATE SPUD: 7/8/97 14:05 |
| CLIENT: AFCEE | RIG TYPE: | *************************************** | _DVIE SLOD: 3/8/64 14:00 |
| 100 NO = 0 + = - | • | CME | DATE CMPL: 7/8/97 |
| | DRLG METHOD: | _HSA | ELEVATION: |
| GEOLOGIST: T. Hall | BORING DIA.: | 4.5" | TEMP.: 950F |
| J. Hall | DRLG FLUID | | |
| COMMENTS: | - | | WEATHER: p.Sunny |
| | | | • |

| (ft.) | Depth
(ft.) | Pro- | US | Contacts | | mples | Sample | Penet. | Remarks |
|---------|----------------|------|----------|-------------------------------|--------------|--------------|----------|------------------|---------------------------|
| (0.17 | | 1770 | | Geologic Description | No. | Depth (ft) | Турс | | TIP = Bkgrad/Reading (ppa |
| | 1 | | CL | CLAY, silty, brn, moist | | 0-5 | | | Ψ |
| | | | | | 1 | 0-3 | | | |
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| | | | <u> </u> | SAA | | | | 412 | |
| ĺ | | | 10 | | - | 5-7 | D | 12 | 0.0 |
| t | | | 40 | SAND IGRAVEZ, bra/white, mist | | | <u> </u> | 12 | |
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| ŀ | - | | | SAA, grey stain, stg. oder | Lab | 22-24 | D | 772 | 40 |
| - | | | | v.m.st-wet | 14:25 | | | 10 | |
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tr - trace

lt - light

m - medium

D - DRIVE

C Core recovery

sm - some & - and dk - dark bf - buff

c - coarse

BH - Bore Hole

C - CORE

G - GRAB

Core lost

@ - at

brn - brown blk - black SAA - Same As Above

| BORING NO. SROG | CONTRACTOR: | CCI | _ DATE SPUD: 7/8/97 14:41 |
|------------------------|--------------|------|---------------------------|
| | RIG TYPE: | CME | DATE CMPL: 7/8/97 |
| JOB NO.: 726876. 24120 | DRLG METHOD: | HSA | ELEVATION: |
| CEOLOGIST: J. Hall | BORING DIA.: | 4.5" | TEMP.: 95°F |
| COMMENTS: | DRLG FLUID | | WEATHER: p.Sunny |
| | | | , |

| (ft.) | file | | | | | Sample | | Remarks |
|-------|------|-----|--|--|--|--|--|--|
| 4 | | CS | Geologic Description | No. | Depth (ft) | Турс | Res. | TIP = Bkgrad/Reading (ppm |
| 1 | | CL | CLAY, silty, brn., wist | | 0-5 | | | |
| | | | | | | | | |
| | | | | 1 | | | | |
| | | | | 1 | | | | |
| 5 | | | · | | | | | |
| | | ML | SILT, clayer, arex/hon/red | | | | 80 | 5.0 |
| | | | woist us odor | | 5-7 | D | 1/2 | 3.0 |
| | | | · | | | | | |
| | | | | | | | | |
| 10 | | | | | | | | |
| | | | SAA | | | | 4, | 7.0 |
| | | SM- | SAND on silt telev are-/rell | | 1012 | D | 710 | 7.0 |
| | | sc | | | | | | |
| | | · | F. A. S. S. S. S. S. S. S. S. S. S. S. S. S. | | | | | |
| 15 | | | • | | | | | |
| | | ML | SILT, claver sm. f. sand prance | Lab | | - | 34, | 10,0 |
| | | 3 | SAND fouf It grey mist | | 15-17 | \mathcal{D} | 7 | |
| | | 38 | V. Sl. och v | | | | | |
| | | | | | j | | | <u> </u> |
| 20 | | | | İ | ļ | | | ! |
| | | ~ | SAND & COALAT 14. | Cab | | | 7 | 7 0 |
| - | | 6P | TIME TORRIVEL TIGRY, U.MIST- | 1,-,,,, | 20-22 | 0 | 116 | 7.0 |
| | | 4/- | De - OLTI @ ~ 21.5 | | ╂ | | | |
| | | 71 | SILT & CLAY, SM. U. I. Sand, grey, | ł | 22-24 | D | 25 | 2.0 |
| | | 3 | purist-met, no order | | | | 11 | |
| 25 | | | | | | | | |
| | İ | | | | | | | |
| | | | |] | | 1 | | |
| | | | | _ | Ì | | | |
| | | | |] | | | | |
| 30 | | | | | | | | |
| | 10 | 10 | 10 SM-SC 15 ML SP 20 GP ML-CL 25 | ML SILT, clayer, grer/brn./red Noist no odor SAA SM-SAND sm silt tclay, grer/red/ sc orange, moist ML SILT, clayer, sm. f. sawl, orange SP SAND fu.f., It grey, moist v. sl. odor 20 GP SAND & CRAVET It grey, u.mist- wet - water e ~ 21.5 ML-SILT & CCAY sm. u.f. sawd, grey, LL mist-wet, no oder 25 | ML SILT, clayer, grer/brn./red Moist ms order SAA SM-SAND sm silt tclay, grey/red/ SC orange, noist ML SILT, clayer, sm. f. sawl, orange Lab SP SAND fv.f., It grey, noist V. Sl. order 20 GP SAND + CRAVET It grey, v. mist-Lab wet - v. b. o. 21.5 ML-SILT + CLAY sm. v. f. sawd, grey, CL mist-wet, no order 25 | ML SILT, clayer, grey/brn./red 5-7 SAA SM-SAND sm silt tolay, grey/ml/ sc orange, moist ML SILT, clayer, sm. f. saml, orange Lab SAND fu.f., It grey, moist U. Sl orbor 20 GD SAND & CRAVET It grey, w.mist-Lab wet - u.t. e - 21.5 ML-SILT & CLAY sm. v.f. sand, grey, CL mist-wet, moder 25 | ML SILT, clayer, grey/brn/red 5-7 D SAA SM-SAND sm sitticley, grey/red/ SC orange, moist ML SILT, clayer, sm.f. sand, orange Lab 15-17 D SP SAND fu.f., It grey, moist 44:50 U. Sl orbor 20 GP SAND & GRAVET It grey, u.m.st-Lab 20-22 D ML-SILT & CLAY sm.u.f. sand, grey, 22-24 D 25 ML-SILT & CLAY sm.u.f. sand, grey, 22-24 D | ML SILT, clayer, grey/brn./red 5-7 D 88 10 SAA SM-SAND SM Silttclay, grey/ml/ sc orange, moist ML SILT, clayer, SM. f. saml, orange Lab 15-72 D 844 SP SAND fu.f., 1t grey, noist 14:50 U. SI orbor 20 GP SAND & CRAVET 1t grey, u.m.st-Lab 15:00 10-22 D 716 Leet - U.b. & ~21.5 ML-SILT & CLAY SM. U.f. saml, grey, 22-24 D 25 LL maist-wet, no order 25 |

al - alight v - very
tr - trace lt - light

f - fine m - medium SAMPLE TYPE

D - DRIVE C Core recovery

sm - some & - and dk - dark bf - buff c - coarse BH - Bore Hole C - CORE G - GRAB

Core lost

Ø − at w − with brn - brown blk - black SAA - Same As Above

| | | STATION LUG | |
|------------------------------|--------------|-------------|------------------------------|
| (| CONTRACTOR: | CCI | DATE SPUD: 7/8/97 15:36 |
| IOP NO . FOR THE | RIG TYPE: | | DATE CMPL: 7/8/97 |
| LOCATION: Gunter Annex STONY | DRLG METHOD: | HOM | _ELEVATION: |
| GEOLOGIST: J. Hall COMMENTS: | DRLG FLUID | 4.5" | TEMP.: 95°F WEATHER: 0 SUITA |
| COMMENTS: | | | WEATHER: p.Sunny |

| Elev. | Depth | Pro- | Us | | | | | | |
|-------|----------------------|------|-----|--|---------|--|------|-------------|---------------------------|
| (ft.) | (ft.) | file | CS | Geologic Description | | mples | | Penet. | |
| | 1 | | SM | SAND, silty, bra, moist | No. | | Турс | Res. | TIP = Bkgrnd/Reading (ppm |
| | | | | siry, orn., woist | - | U-5 | | ļ | |
| | | | | | 4 | | | | |
| | | | | | - | 1 | İ | | |
| | 5 | | | | - | 1 | | | |
| | | | UL | RII T | | <u> </u> | | | |
| | \vdash | | | SILT, clayey, orange born, moist | 1 | 5-7 | D | 153_ | 2.0 |
| | | | | ro oder | |] / | 2 | 15378 | |
| | $\vdash \dashv$ | | | · | } | | | | |
| | | | | | | | | | |
| | 10 | | | SAA | | | | | |
| - 1 | | | ML | SILT, sm.f. saultclax, red/ | 416 | | 7 | 46 | 4.0 |
| | | : | CL | grey, moist, no oder | 15:50 | 10-12 | D | 12 | 4.0 |
| | | j | | | | | | | |
| j | | | | | 1 | | | | |
| | 15 | | | | | | | | |
| į | | | ML | SILT, sm clay, It. brn, weist no oder | | | | | |
| [| | | GP | SAND I GRAVEZ, white forange, moist | | 15-17 | 0 | 49,2 | 0.0 |
| Ī | | | 47 | no oder | <u></u> | | | - | |
| Ī | | | 1 | M 6201 | | | | | |
| Ì | 20 | | ŀ | | | l i | | | |
| | | | } | 500 11 | | <u> </u> | | | |
| t | | l | } | SAA, It, grey-white mist | Lab | 20-22 | | 376 | 4-0 |
| ŀ | | i | | | 16:00 | | ᅬ | 12 | • |
| ŀ | | | | SAA, gray torange weto 20.5 | | 22-24 | 8 | 581 | 0,0 |
| } | _ | | | | | | | 11 | |
| | 25 | 1 | - | | | | | | |
| - } | | | | | | | | | |
| | | İ | | | |] | j | į | |
| | | Ì | | | | } | } | | |
| Ĺ | | 1 | ſ | | | | 1 | | |
| | 30 | | _ [| | | | ł | | |
| | _ | | | | | <u> </u> | 1 | | |
| | al – ali | - | | y - very f - fine | | SAMPLE | TYPE | | |
| | tr — tra
sm. — s: | | | t - light m - medium
ik - dark c - coarse | | D - DR | | С | Core recovery |
| | | | | ok - dark c - coarse | | C - CO | RF | | |

& - and bf - buff BH - Bore Hole G-GRAB Core lost brn - brown SAA - Same As Above blk - black

| BORING NO. | SB08 - | CONTRACTOR: | CCI | DATE SPUD: 7/8/97 16:30 |
|-------------------|---------------------|--------------|------|-------------------------|
| LIENT:
OB NO.: | AFCEE | RIG TYPE: | CME | DATE CMPL: 7/8/97 |
| OB NO.: | 726876,24120 | DRLG METHOD: | HSA | ELEVATION: |
| LOCATION: | cunter Annex ST.001 | BORING DIA.: | 4.5" | TEMP.: ^'90° F |
| GEOLOGIST: | J. Hall | DRLG FLUID | | WEATHER: p.Sunny |
| COMMENTS: | | | | |

| | Depth | | US | | | | Sample | | Remarks |
|-------|--------------|--------------|------|--|-------------|------------|---------------|--|----------------------------|
| (ft.) | (ft.) | file | cs | Geologic Description | No. | Depth (ft) | Турс | Res. | TIP = Bkgrnd/Reading (ppm) |
| | 1 | | ML | SILT, sm clay , brn, moist | | 0.5 | | | |
| | | | | | | 1 | | | |
| | | i | | | | | | | |
| | | | | |] | <u> </u> | | | |
| | 5 | | | | | | | | |
| | | | | SAA | | 5-7 | ~ | 45 | 0.0 |
| | | | GP | SANDIGRAVEZ ral/bra/ovange, |] | ' | D | 14 | |
| | | | ا"' | moist; no order | | | | | |
| | | | 1 | | 1 | | ļ | | |
| | 10 | 1 | 1 | | 1 | 1. | | | |
| | 1 | 1 | | SAA, orange | | 1,2,13 | 2 | 134 | 2.0 |
| | | |] | | 1 | 10-12 | D | 134 | |
| | | | | ************************************** | 1 | 1 | | | |
| | - | | | | 1 | İ | | | |
|) | 15 | Ì | 1 | | 1 | | | | |
| | | | 60 | SAUDI/ PAIRZ 14 | Lab | | + | 4 - | 3.0 |
| • | - | 1 | KIT- | SANDIGRAVEZ SM. claytsilt, | 16:30 | 15-17 | D | 4546 | |
| | | 1 | 150 | orange-brn. mist, no oder | + | | | | |
| | | ┨ | ì | | ┨ | | | | |
| | - | ┨ | | | - | 1 | | | |
| | 20 | 4 | | | Lab | - | + | 7 | 1 |
| | <u> </u> | ┨ | 1 | SAA wete-21.5 | 16:40 | , | D | 334 | 5.0 |
| | | 4 | 1 | | 10,40 | <u></u> | | | |
| | ļ | ļ | ↓ | SAA | - | 1 | D | 3334 | 1.0 |
| | | <u> </u> | CL | CLAY, silty, grey, u.moist No orbor | | | | 1-4 | |
| | 25 | _ | | | _ | | | | |
| | |] | | | | | | | |
| | | | 1 | | | | | 1 | |
| | | | ł | | | | | | |
| | | 7 | 1 | | | | | | |
| | 30 | 7 | İ | | | | | | |
| | | _1, | | | | | | <u> </u> | |
| | | slight | | v - very f - fine | | | LE TY | | 6 |
| | | trace | | lt - light m - medium | | | DRIVE
CORE | С | Core recovery |
| 1 | | – some | | dk - dark c - coarse
bf - buff BH - Bore Hole | | | GRAB | | Core lost |

brn - brown bik - black

SAA - Same As Above Water level drilled

| Project | Name <u>(</u>
Number <u>)</u> | onler A
726870 | nnez | +120 | | | | |
|--|--|---|-----------|---|--|-------------------|-----------------|----------------------|
| Sample | Number | GMW | | | | | | |
| Type of | Sample: | grab | | composi | ite | depth int | erval | other |
| Baile
Baile | Volume (BV
r Inside D
r Length (
D/24) <sup>2</sup> (L)(|)iameter
L) | |)
 | (in
(ft
(ga | | | |
| Static
Water Co
Casing
Casing | ell Depth
Water Leve
olumn (TD-
Inside Dia
Volume (CV
24) <sup>2</sup> (TD-SW | l (SWL)
SWL)
meter (
l | CID) | _2 | 1.6 (ft
6.1 (ft
8.5 (ft
(in |)
)
) | . • | • |
| CV/BV | or
(8 | me (BCV
/24) <sup>2</sup> (TI

ID/24) <sup>2</sup> | D-SWL | · | | ils/casing | J volume) | • |
| | | | | | | | | |
| Purge Vo
(BCV)(| Olume (PV)
(PV) | | | <u>4.</u> | (cae | ings) Ga | al. | |
| (BCV) | Gasing/
Bail No. | Temp | Нq | Elec | (ba | (ledox | al.

Odor | Visual
Appearance |
| (BCV)(Time | Gasing/
Bail No. | 22.2 | pH
AMA | Elec
Cond
ws/cm
32,4 | (ba- | (ledox | Odor | Appearance |
| Time 1643 | Gasing/
Bail No. | 22.2 | | Elec
Cond
ws/cm
32.4 | DO me 11 (6, 79) | (ledox | Odor
None | |
| (BCV)(Time | Gasing/
Bail No. | 22.2 | | Elec
Cond
ws/cm
32,4
32,4
32,7 | DO
me 11
(6.79
(6.89
(6.88 | (ledox | Odor
None | Appearance |
| Time 1643 1657 | Gasing/
Bail No. | 22.2
21.1
21.0
20.9 | | Elec
Cond
ws/cm
32,4
\$2.4
\$2.7
32.7 | DO
mg 11
(a. 79
(a. 89
(a. 89
(a. 89) | (ledox | Odor
None | Appearance |
| Time 1643 1657 | (PV) Casing/ Bail No. Oil LO 2.0 3.0 | 22.2 | | Elec
Cond
ws/cm
32,4
32,4
32,4 | DO
me 11
(6, 79
(6, 89
(6, 89
(6, 89
(6, 89) | (ledox | Odor
None | Appearance |
| Time 1643 1657 | Gasing/
Bail No.
Gal.
O.1
L.O
2.0
3.0
4.0 | 22.2
21.1
21.0
20.9
70.9 | | Elec
Cond
ws/cm
32.4
\$2.4
\$2.7
32.7 | DO
mg 11
(a. 79
(a. 89
(a. 89
(a. 89) | (ledox | Odor
None | Appearance |
| Time 1643 1657 1705 1713 1710 Otal Vo | Gasing/
Bail No.
Oil
LO
2.0
3.0
4.0
4.0 | 22.2
21.0
20.9
70.9
20.9 | MA | Elec
Cond
ws/cm
32.4
\$2.7
\$2.7
\$2.7
\$2.7 | (ba: | (ledox | Odor
None | Appearance |
| Time 1643 1657 1705 1713 1710 Total Vo (DV)(Colleather | Casing/
Bail No.
Oil
LO
2.0
3.0
4.0
4.0 | 22.2
21.1
21.0
20.9
70.9 | MA | Elec
Cond
ws/cm
32.4
\$2.4
\$2.7
32.7 | (ba: | (ledox mv little) | Odor
None | Appearance |
| Time 1643 1657 1705 1713 1710 Otal Vo | Casing/
Bail No.
Coll
Coll
Coll
Coll
Coll
Coll
Coll
Co | 22.2
21.0
20.9
70.9
20.9 | MA | Elec
Cond
ws/cm
32.4
\$2.7
\$2.7
\$2.7
\$2.7 | (ba: | (ledox mv little) | Odor
None | Appearance |

| Project Name Gau
Project Number | | | | | ٠ | | |
|--|--|-------|---|---|------------------------------|-------------------------------|----------------------|
| Sample Number Gu | I-GHW | 2 | | | | | |
| Type of Sample: | grāb | C | composit | te d | epth inte | rval d | other |
| Bailer Volume (BV
Bailer Inside D
Bailer Length (BID/24) <sup>2</sup> (L)(I | iameter
L) | _ | | (in)
(ft)
(gal, | /bailer) | a 400 am am am am am am am am | |
| Total Well Depth
Static Water Leve
Water Column (TD-:
Casing Inside Dia
Casing Volume (CV
(CID/24) <sup>2</sup> (TD-SWI | l (SWL)
SWL)
meter (C
) | | _4 | (.2 (ft)
.24 (ft)
(ft)
(in) | . 16 gal | afti por | Je |
| CV/BV or | me (BCV)
/24) <sup>2</sup> (TD

ID/24) <sup>2</sup> (| -SWL) | · | (bai | ls/casing | volume) | • |
| | | | | | | | |
| Purge Volume (PV) (BCV)(PV) | | | | (cas
(bai | ings) Gal
ls) | l. · | |
| (BCV)(PV) Gasing/ Time Bail No. | Temp | рН | 2.
MS/cm
Elec
Cond | 0 (cas
(bai | ings) Galls) Redox mu | Odor | Visual
Appearance |
| Time Gasing/
Bail No. | <u>°C</u> 23 | рН | #S/cm
Elec
Cond | 0.0
*3/8
5.57 | Redox | | |
| Time Gasing/
Bail No. | 23
22.0 | рН | #5/cm
Elec
Cond
45-2
42-5 | 0.0
*2/8
5.57
5.33 | Redox | Odor | Appearance |
| (BCV)(PV) Time Gasing/Bail No. | 23
22.0
21.8 | рН | #3/cm
Elec
Cond
45.2
42.5
42.0 | 0,0
*2/8
5.57
5.33
5.25 | Redox | Odor | Appearance |
| (BCV)(PV) Time Gasing/Bail No. | 23
22.0 | рН | #5/cm
Elec
Cond
45-2
42-5 | 0.0
*2/8
5.57
5.33 | Redox | Odor | Appearance |
| (BCV)(PV) Time Gasing/Bail No. | 23
22.0
21.8
21.8
21.8 | | #5/cm
Elec
Cond
45.2
42.5
42.0
41.6 | 0,0
*2/1
5.57
5.33
5.25
5.17 | Redox
mu | Odor | Appearance |
| (BCV)(PV) Time Gasing/
Bail No.
 4:00 l
 | 23
22.0
21.8
21.8
21.8 | 4.40 | #5/cm
Elec
Cond
45.2
42.5
42.0
41.6 | 0.0
*2/1
5.57
5.33
5.25
5.17
5.18 | Redox
mu | Odor | Appearance |
| (BCV)(PV) Time Gasing/Bail No. | 23
22.0
21.8
20.8
21.8
ved (PV) | 4.40 | #5/cm Elec Cond 45.2 42.5 42.0 41.6 | 0.0
 | Redox
mu | Odor | Appearance |
| (BCV)(PV) Time Gasing/Bail No. | 23
22.0
21.8
20.8
21.8
ved (PV) | 4.40 | #5/cm Elec Cond 45.2 42.5 42.0 41.6 | 0.0
*2/1
5.57
5.33
5.25
5.17
5.18 | Redox
mu | Odor | Appearance |

| Project | Name <u>Gu</u>
Number <u>7</u> | 26876 | Anna
.241 | 20
20 | | | | |
|---|--|---|-----------------|-----------------|--|-----------------|---------|----------------------|
| Sample N | Sample: | grab |) | composi | te d | lepth inte | rval | other |
| Baile:
Baile: | Volume (BÝ
r Inside D
r Length (
D/24) <sup>2</sup> (L)(| iameter
L) | - |) | (in)
(ft)
(gal | | | |
| Static Water Co
Casing 1
Casing V | ell Depth
Water Leve
Dlumn (TD-
Inside Dia
Volume (CV
24) <sup>2</sup> (TD-SW | l (SWL)
SWL)
meter (
) | CID) | | (ft)
(-8 (ft)
(-0 (ft)
(in)
(gal | • | | • |
| Bails/Ca | or | me (BCV
/24) <sup>2</sup> (TI

ID/24) <sup>2</sup> | D-SWL | • | | ls/casing | volume) | |
| Purge Vo
(BCV)(| olume (PV)
(PV) | 140 day ay ay ay ay ay | . بي بت ده نب د | | 4(cas
(bai | ings) Ga
ls) | (.
 | |
| Time | Gasing/
Bail No. | Temp
<u>~</u> C | рН | Elec
Cond | Redox | D.U
M5/L | Odor | Visual
Appearance |
| 11:10 | 0.5 | | 5.63 | 39,0 | 45.0 | 3.76 | | Clour |
| 11:15 | 1.0 | 23.2 | | 35.4 | 74.2 | 13.72 | | 7.1 |
| 11:20 | 2.0 | 23.1 | 4.72 | 35.9 | 1.04,9 | 3.54 | | " |
| | 1 7 61 | 123.1 | 4.64 | 35.7 | 104.3 | 3.53
3.52 | | (r |
| 11:29 | 3.0 | | | | | | | |
| 11:29 | 4.0 | 23.j | 4.62 | 35.8 | | 3.52 | | ا ب |
| | 4.0 | 23.j | 4.62 | 35-8 | 111 | 3.52 | | . |
| | 4.0 | 23.j | 4.62 | 35-8 | 111 | 3.52 | | • |
| 70tal Vo | Olume Remo | 23. j |) . | 3
<u>4</u> , | | ings) | | |
| Total Vo | olume Removed San | 23.j |) .
&5*F | 3
<u>4</u> , | | ings) | | |

| Project
Project | Name | 2067
72687 | Annex
16.21 | 4120 | | | | |
|---|---|--|----------------|----------------|---|----------------|--|--|
| Sample | Number | Gm | w-4 | | | | | |
| Type of | Sample: | grab |) | composi | te d | epth inte | rval | other |
| Baile:
Baile: | Volume (BV
r Inside D
r Length (I
D/24) <sup>2</sup> (L)(r | iameter
L) | |) | (in)
(ft)
(gal, |
/bailer) | | |
| Static Nater Co
Casing 1
Casing N | ell Depth (
Vater Leve
Dlumn (TD-S
Inside Diar
Volume (CV
24) <sup>2</sup> (TD-SWL | l (SWL)
SWL)
neter ((
) | | 21.
3.
7 | 1 (ft)
42 (ft)
48 (ft)
(in)
4 (gal) | /casing) | | • |
| CV/BV | or
(8) | ne (BCV)
/24) <sup>2</sup> (TC

[D/24) <sup>2</sup> (|)-SWL) | | (bai
(cas
(bai | | | |
| | | | | | | | | |
| Time | Casing/
Bail No. | Temp
<u>►C</u> | рH | Elec
Cond | Redux
my | DO
myle | Odor | Visual
Appearance |
| 0934 | 0.4 | 22.2 | | 47.9 | 127.5 | 0.87 | pet, adus | clear |
| 0948 | 1.3 | 21.6 | | 99.0 | 92.0 | 6.39 | / h | ٦ |
| 0954 | 7.3 | 21.7 | | 109.0 | 75.L | 0.29 | | |
| 1006 | 4,5 | 21.7 | | 115.0 | 66.4 | 0,25 | | |
| 1012 | M5705.5 | 21.7 | 6.00 | 117.3 | 623 | 15.0 | | |
| 1010 | 6.0 | 21.7 | 30,2 | 119.4 | 31.0 | 0.21 | | |
| 1025 | 6.5 | 21.7 | 6.07 | 120.2 | 37.2 | 0.20 | | |
| Total Vo
(DV)(0 | olume Remov
CV) | ved (PV) | | 3 | | ings)
lons) | | |
| Weather | | <u> </u> | | <u>e,~9</u> | ع د و | | | |
| Date San
Time San | $\begin{array}{c} \text{npled} & \frac{7}{2} \\ \text{npled} & \frac{7}{2} \end{array}$ | 0:30 | 7 | | | | | |
| Name of | Sampler | Davi | 17 | tee ts | | | | |

| | Project | Name 4
Number _ | 72687 | 6.24 | 1/20 | | | | |
|----------|------------------------------------|--|--|----------------------|------------------------------|--|--------------------|------------|----------------------|
| | | Sample: | grab |) | compos | ite | depth int | erval | other |
| • | Baile
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(L) | |)) | (in
(ft
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2.5 (ft
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(BID/24) <sup>2</sup> (L)(I | iameter (BI
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ID/24) <sup>2</sup> (L) | L) | (bai | ls/casing | volume) | • | |
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1655 4.5 | 20.9 | 39.7 | 7.52 | 1 | <u> </u> | | |
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· | Her level 25. | 58 |
| Name of Sampler | David | | | | | | |

APPENDIX C THIESSEN POLYGON METHOD CALCULATIONS

THEISSEN POLYGON METHOD ANALYSIS FOR TOTAL BENZENE GUNTER ANNEX, SITE ST-001

| Polygon | Soil | Soil | Soil | Soil | Mean Soil | Element | $A_i \times C_{avg,1}$ | Area Weighted |
|---------|--------|---------------|---------------|---------------|---------------------|------------------------------------|---------------------------|---------------|
| Element | Boring | Concentration | Concentration | Concentration | Concentration | Area | | Average |
| | | Depth 1 | Depth 2 | Depth 3 | C <sub>avg, I</sub> | C <sub>avg, I</sub> A <sub>i</sub> | | Concentration |
| | | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (ft²) | (ft <sup>2</sup> - mg/kg) | (mg/kg) |
| I | SB01 | 0.0005 | 0.0005 | NA | 0.0005 | 2910 | 1.455 | |
| 11 | SB02 | 0.0005 | 0.0005 | NA | 0.0005 | 2000 | 1 | |
| Ш | SB03 | 0.0005 | 0.0005 | 0.25 | 0.0837 | 2370 | 198 | |
| IV | SB04 | 0.0030 | NA | NA | 0.0030 | 1390 | 4.17 | |
| V | SB05 | 0.0005 | 1.0000 | NA | 0.5003 | 2240 | 1120.56 | |
| l∨ı | SB06 | 0.0010 | 0.0005 | NA | 0.0008 | 4010 | 3.0075 | |
| VII | SB07 | 0.0005 | 0.0005 | NA | 0.0005 | 4830 | 2.415 | |
| VIII | SB08 | 0.0010 | 0.0005 | NA | 0.0008 | 3160 | 2.37 | |
| | | | | | TOTAL | 22900 | 1300 | 0.06 |

Note:

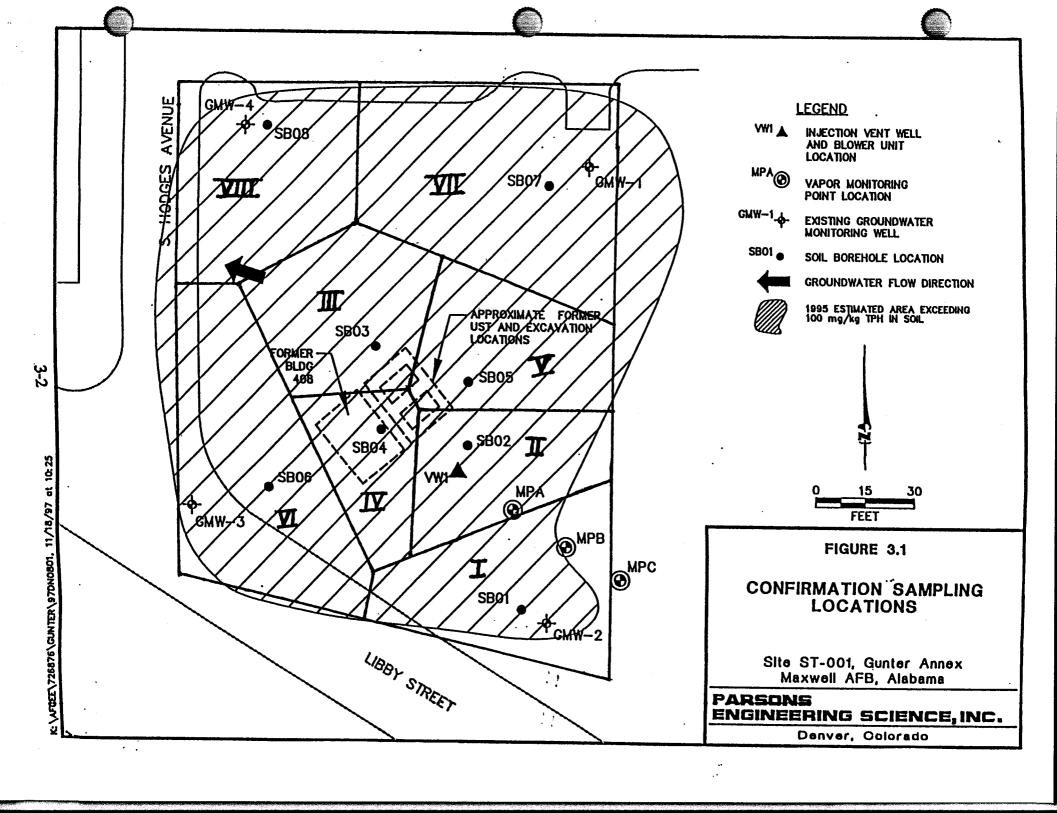
A value equal to 1/2 the method detection limit substituted for non-detect values.

THEISSEN POLYGON METHOD ANALYSIS FOR TOTAL XYLENES GUNTER ANNEX, SITE ST-001

| Polygon | Soil | Soil | Soil | Soil | Mean Soil | Element | $A_i \times C_{avg,1}$ | Area Weighted |
|---------|--------|---------------|---------------|---------------|---------------------|---------|---------------------------|---------------|
| Element | Boring | Concentration | Concentration | Concentration | Concentration | Area | | Average |
| • | | Depth 1 | Depth 2 | Depth 3 | C <sub>avg, I</sub> | A_{i} | | Concentration |
| | | (mg/kg) | (mg/kg) | (mg/kg) | (mg/kg) | (ft²) | (ft <sup>2</sup> - mg/kg) | (mg/kg) |
| 1 | SB01 | 0.001 | 0.001 | NA | 0.001 | 2910 | 2.91 | |
| 11 | SB02 | 0.001 | 0.001 | NA | 0.001 | 2000 | 2 | |
| 111 | SB03 | 0.001 | 0.001 | 0.55 | 0.184 | 2370 | 436 | |
| IV | SB04 | 0.006 | NA | NA | 0.006 | 1390 | 8.34 | |
| V | SB05 | 0.001 | 28.000 | NA | 14.0 | 2240 | 31400 | |
| VI | SB06 | 0.001 | 0.001 | NA | 0.001 | 4010 | 4.01 | |
| VII | SB07 | 0.001 | 0.001 | NA | 0.001 | 4830 | 4.83 | |
| VIII | SB08 | 0.001 | 0.0015 | NA | 0.001 | 3160 | 3.95 | |
| | • | • | | | TOTAL | 22900 | 31900 | 1.39 |

Note:

A value equal to 1/2 the method detection limit substituted for non-detect values.



APPENDIX D ADEM REPORTING FORMS

GROUNDWATER MONITORING REPORT

SUBMITTAL DATE:

| | | • |
|-------------------------------------|--|----------------------------------|
| | | |
| FACILITY NAME: | Maxwell AFB, Gunter Annex | . Building 408 |
| FACILITY ADDRESS: | Maxwell AFB, Gunter Annex
Montgomery, Alabama 3611 | . Cona W I. Dickinson Drive |
| FACILITY I.D. NO.: | 15048-101-014625 | |
| UST OR AST INCIDENT | T NO.: | |
| | THE FOLLOWING QUESTION | S REGARDING THIS SITE: |
| Number of monitoring v | vells at the site? | 7 |
| Number of monitoring w | vells containing Free Product? | 0 |
| Dis | solved constituents above CALs? | Yes, below ACAL's |
| Are free read and | solved constituents below CALs? | |
| If we what date did | y activities currently in progress? | No |
| 11 yes, what date did | recovery activities commence? | |
| If no, please indicate information: | reason (i.e. recently discovered or observations of the product: Identify and indicate a | rved) and complete the following |
| None / | / | 1 |
| | / | |
| | urrently being conducted on the site? I | |
| received approvat to imple | ediation (approved CAP)? If yes, indicate the control of the contr | remediation system): |
| or remediation (D | ioventing) September 12, 19 | 995 - present |
| See confirmation sa | mpling and analysis report | for City CT COT - |

| Miscellaneous information not directly requested: | |
|---|---|
| | • |
| | |
| | |
| | |

SUBMIT THIS FORM WITH THE FOLLOWING ATTACHMENTS:

- Scaled site map identifying: all monitoring wells, groundwater elevations, groundwater elevation contours, and primary groundwater flow direction
- Scaled site map identifying: all monitoring wells, free product thickness, and total dissolved BTEX for each monitoring well
- Scaled site map identifying: all monitoring wells, Benzene levels, MTBE levels (if applicable for each monitoring well), or other appropriate constituents detected at this site
- Table containing: historical groundwater elevations for each of the monitoring wells.
- Table containing: historical free product thickness, Benzene levels, MTBE levels (if applicable),
 Ethylbenzene, Toluene, Xylenes, total BTEX levels and other appropriate constituents detected at this
 site for each of the monitoring wells
- Copies of lab analysis sheets for this sampling event for each of the monitoring wells
- Copies of chain of custody documentation for this sampling event
- Brief narrative description of procedures utilized to obtain groundwater sampling data

| Signature of Preparer of this Report: | · |
|---------------------------------------|--|
| Type or print Name: | John Hall |
| Company Name: | Parsons Engineering Science, Inc. |
| Company Address: | 1700 Broadway, Suite 900, Denver, CO 80290 |
| Company Address: | . Jenver, CO |

GW Monitoring Form ADEM (5/1/94)

ADEM GROUNDWATER BRANCH

UST SITE CLASSIFICATION SYSTEM

CHECKLIST

Please read all of the following statements and mark either yes or no if the statement applies to your site. If you have conducted a Preliminary or Secondary Investigation, all questions should be answered. Closure site assessment reports may not provide you with all the necessary information, but answer the statements with the knowledge obtained during the closure site assessment.

| SITE NAME:
SITE ADDRESS: | Maxwell Air Force Base, Gunter Annex, Bldg. 408 Maxwell AFB, Gunter Annex, Cong.W.L. Dickinson Dr Montgomery, Alabama 36115 |
|---|---|
| FACILITY I.D. NO.:
UST INCIDENT NO.: | 15048-010-014625 |
| OWNER NAME:
OWNER ADDRESS: | U.S. Air Force Maxwell AFB, Gunter Annex
Cong. W.L. Dickinson Drive, Montgomery, AL 36115 |
| NAME & ADDRESS OF PERSON
COMPLETING THIS FORM: | John Hall
Parsons Engineering Science, Inc.
1700 Broadway. Suite 900, Denver, CO 80290 |

| CLASSIFICATION | DESCRIPTION | YES | NO |
|----------------|---|------|----------|
| CLASS:A | MAKED) A TENEREAG DO MOMAN HEAT THE HUMANN ACTIV
OR SENSETVE ENVIRONMENTAGE PROPERTY. | 7723 | NO |
| A.1 | Vapor concentrations at or approaching explosive levels that could cause health effects, are present in a residence or building. | | N |
| A.2 | Vapor concentrations at or approaching explosive levels are present in subsurface utility system(s), but no buildings or residences are impacted. | | X |
| CLASSE | BANGERIAS ER HERE A CHECKERINAN HERAL THEREINAN SAFETY. OR SENSIFIYE ENVIRONMENTATION FROM PROPERTY. | | |
| B.1 . | An active public water supply well, public water supply line, or public surface water intake is impacted or immediately threatened. | | ☑ |
| B.2 | An active domestic water supply well, domestic water supply line or domestic surface water intake is impacted or immediately threatened. | | Ø |
| B.3 | The release is located within a designated Wellhead Protection Area I. | | |
| CLASS C | IMMEDIATE TERREAT TO HER DAY OF A THE HUMAN SAFETY OR SENSETYEE ENVIRONMENCE AND RECEIPTOR | | N |
| C.1 | Ambient vapor/particulate concentrations exceed concentrations of concern from an acute exposure, or safety viewpoint. | | Ø |
| | | | |
| C.2 | Free product is present on the groundwater, at ground surface, on surface water bodies, in utilities other than water supply lines, or in surface water runoff. | | X |

| CLASSIFICATION | DESCRIPTION | YES | NO |
|----------------|---|-------|------|
| CLASSID | | 1 220 | 1,10 |
| CLESSE | SHORT TERM THREAT TO HUMAN HEALTH SAFETY OR SENSITIVE ENVIRONMENTAL RECEPTORS | | |
| D.1 | There is a potential for explosive levels, or concentrations of vapors that could cause acute effects, to accumulate in a residence or other building. | | X |
| D.2 | A non-potable water supply well is impacted or immediately threatened. | | X |
| D.3 | Shallow contaminated surface soils are open to public access, and dwellings, parks, playgrounds, day care centers, schools or similar use facilities are within 500 feet of those soils. | | IX) |
| | SHORT TERM THREAT FO HUMAN HEALTH SAFETY OR SENSITIVE ENVIRONMENTAL RESERVED. | | |
| E.1 | A sensitive habitat or sensitive resources (sport fish, economically important species, threatened and endangered species, etc.) are impacted and affected. | | X |
| CLASSF | SHORE TERM THREAT TO HUMAN HEALTH SAFETY OF SENSITIVE ENVIRONMENTAL RECEPTORS | | |
| F.1 | Groundwater is impacted and a public well is located within 1 mile of the site. | | Z |
| F2 | Groundwater is impacted and a domestic well is located within 1,000 feet of the site. | | |
| F.3
CLASS G | Contaminated soils and/or groundwater are located within designated Wellhead Protection Areas (Areas II or III). | | X) |
| | SHORE TERM SHREAT TO HEMAN HEAT TH SAFETY OR
SENSITIVE ENVIRONMENTAL RECEPTIONS | | |
| G.1 | Contaminated soils and/or groundwater are located within areas vulnerable to contamination from surface sources | | N . |
| GLASSA | SHORE TERM THREAD TO TRIMAN HEALTH, SAFETY OR
SENSETUL ENVIRONMENTAL PRECEDITORS | | |
| H.1 | Impacted surface water, stormwater or groundwater discharges within 500 feet of a surface water body used for human drinking water, whole body water-contact sports, or habitat to a protected or listed endangered plant and animal species. | | DX) |
| LASSI | LONG TERM TEREA DEPONUMAN HEALTH SARELY OF
SENSITIVE ENVIRONMENTAL SPECIFOTORS | | |
| .1. | Site has contaminated soils and/or groundwater but does not meet any of the above mentioned criteria. | Ø | |



| ADDITIONAL COMMENTS: | | • |
|--|---|----------------|
| | | |
| | | |
| Complete the about 5 of the same | | • |
| Complete the classification evaluation questions list highest rank of the site (A.1 is the highest rank) bas | ted above. Upon completion, determi
ed on the statements answered with a | ne the
yes. |

Enter the determined classification ranking:

ADEM GROUNDWATER BRANCH SITE CLASSIFICATION CHECKLIST (5/8/95)

APPENDIX E LABORATORY ANALYTICAL RESULTS



DATE RECEIVED: 10-JUL-1997

REPORT NUMBER:

D97-8568

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY :

Parsons Engineering Science

ADDRESS:

257A 28 Rd.

Grand JCT, CO 81503

ATTENTION : Mr. John Hall

PROJECT: 726876.24120 Gunter Annex

CASE NARRATIVE SUMMARY

This is an ITS Level 4 data package, containing results for the analysis of volatile organics, semivolatile organics and metals by EPA methodologies.

EPA Method 8020 Volatile Aromatics Analysis

Sample Dilutions

Samples D97-8568-7 and -8 were analyzed at dilutions of 1:500 and 1:5, respectively, due to high levels of non-target analytes.

Sample D97-8568-10 was analyzed at a 1:1000 dilution, respectively, due to high levels of target analytes.

Second Column Confirmations

For the analysis of sample D97-8568-10, the results for the target analytes toluene and m,p-xylene did not agree within ±50% between the primary and confirmation columns. Therefore, the lower result was reported, and should be considered unconfirmed.

Method 8015M Total Volatile Petroleum Hydrocarbons Analysis

Sample Dilutions

Samples D97-8568-7, -8 and -10 were analyzed at dilutions of 1:500, 1:50 and 1:1000, respectively, due to high levels of target analytes.

Method 8015M Total Extractable Petroleum Hydrocarbons Analysis

No observations were documented for the analysis of total extractable etroleum hydrocarbons.

ITS Intertek Testing Services Environmental Laboratories

Parsons Engineering Science page 2

Method 8310 Polynuclear Aromatic Hydrocarbons Analysis

Surrogate Recoveries

For the original analysis of sample D97-8568-13, the recovery for the surrogate p-terphenyl was outside of the QC limits of 22-167%. Therefore, the sample was re-extracted outside of holding time and reanalyzed, yeilding a surrogate recovery within QC limits. The results of the original analysis were reported for this data package. The results for the reanalysis are included in the data package for confirmation.

Second Detector Confirmations

For the analysis of sample D97-8568-7, the results for the target analyte dibenzo(a,h)anthracene did not agree within $\pm 50\%$ between the UV and fluorescence detectors. Therefore, the lower result was reported, and should be considered unconfirmed.

For the analysis of sample D97-8568-10, the results for the target analytes dibenzo(a,h)anthracene and indeno(1,2,3-cd)pyrene did not agree within ±50% between the UV and fluorescence detectors. Therefore, the lower results were reported, and should be considered unconfirmed.

Metals Analysis

Matrix Spike Analysis

For the matrix spike/matrix spike duplicate analysis of sample D97-8568-1, the recoveries for the spiking compound lead were outside of the QC limits of 75-125%, because the concentration of this analyte in the unspiked sample was greater than four times the spiking level of 2.00 mg/Kg. Since the laboratory control spike analysis was within QC limits, the results were accepted.

No further observations were documented during the sample analysis for this project.

If there are any questions, feel free to contact Ms. Janice McKittrick, at (972) 238-5591.

Alan Humason

Data Review Group Leader

Intertek Testing Services NA Inc.

1089 East Collins Boulevard Richardson, TX 75081
Telephone (972) 238-5591 Fax (972) 238-5592

| Report to: Company: Parsons ES Address: 257A 28 Rd Grand Jct., Co 81503 Contact: John Hall Phone: 970 2448829 Fax: " Sampler's Name Juhn F. Hall Proj. No. C. Project Name | Invoice Company: Parson Address: 1700 (Denver Contact: Tuhn Phone: 303 83 PO/SO #: 72687 | Srual
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| Contact: John Hall | Contact: John Ra | | | | _ | | | يان م | 7 / | ' / | | | / | / | / | / / | 1 | 12 13 | (O).
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| Phone:(970)244-8829 | Phone: (303) 831 | 1-81 | 00 | · | | | | | | /≈ | \forall | / / | / / | / , | / / | / / | C | stody Sea | |
| Fax: | PO/SO #: 726876 | <u>ユ</u> | 4120 | <u>o</u> | _ | | | 7 | $\mathcal{A} \stackrel{\langle}{\downarrow}$ | 33 | / / | | | _/ | | | - I. | act | N/Y |
| Alternete John Ratz | | | | | | | 1 | \J\ 9 | D/ 🗠 | W k | | | | | | | - | | |
| Sampler's Name John F. Hall | Sampler's Signature | | | | | | 43 | $S/\sim 1$ | , 4 | 7 | | | / | / | | | For | reened
r Radioactivi | • |
| Proj. No. 726876. Gunter Annex, Biog | Jantin Octor 2 | No./T | pe of C | ontain | ers | | - / | | 7. | / / | / / | ~ c | b/ | 1 | | RI | GI | NA | 11 |
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| S 1/471005 x 64-5802-1 | | | | | 2 | × | | | × | + | <u> </u> | | 9(| | 1=1 | NE | n F | OR | |
| 5 7/6/47 1010 254-5802-5 | | | | | 2 | × | × | <u>×</u> | × | \top | T | 4 | Ε, | | 11 | 100 | TIV | iTV | |
| S 7/8/4-1125 X 64-5803-1 | | | | | 2 | × | × | × | × | | 1 | 3 | - " | <u> </u> | | | 1 1 1 | 1 5 9 | |
| S 1/2/12/135 × 44-5803-2 | | | | | 2 | × | × | \pm | × | 1 | | 1. | | | Ĺ | | | THE STATE | |
| S 7/8/47/200 X64-5B03-2 | | | | | 3 | X | × | | X | | | 4 | | CO | OLL:
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ED | |
| S 1/471205 × GU-5804-1 | | | | | _ | × | <u>×</u> | × | \mathbf{x}^{\dagger} | | † | 8 | | | | 4 | | °C | |
| 5 1415 × 44-5805-1 | | | | | 2 | × | × | | X | 1 | | q | | | | | | | |
| 5 1/49 1425 × 44-5 805-2 | | | | | 3 | × | × | × | × | | | 10 | | | | | | | |
| Turn around time Priority 1 or Standard ☐ Priority 2 | or 50% Priority 3 or 100% | | 4 ERS | · | | | • BTE | X (602/ | 8020), | PH (418 | .1 or 80 | 015), V | OLAT | ILES (| 624/8 | 240), IGNIT | ABILITY. | . TOTAL LEA | D (6010) |
| Relinguished by: (Signature) Date: 7/9/97 10 | Time: Received by: (Signa | iture) | | 7/ |) ate | 2 | Tio
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OC) | Ren | narks | | | | | | | | | |
| | Time: Received by: (Signa | iture) | 7 | 1 | Date | : . | Ti | me: | 1 | | * | | | | | | | | |
| | to som | QL. | 9 | -+- | | 97 | | 12 | : | | | | | | | | | | |
| Relinquished by: (Signature) Date: | Time: Received by: (Signa | iture) | J | ' | Date | :
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| OFFICE USE ONLY | | | | | | | | | | | | | | | | | | | |
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| | | | | | | | | | | | | | | | - | | | | |

COOLER RECEIPT FORM

| | Received: 7-10-97 Project: 726876.2 Logged-in: Received by: 5-2 | 4/20
nask | - |
|-------|--|--------------|-------------------|
| No. o | of coolers received: Cooler Numbers: | | ク
ー |
| 1 | Shipping slip. If yes, carrier and bill number: 972565546 | (es) | No |
| 2 | Custody seals on cooler. If yes, how many and where: | (69) | No |
| 3 | Custody seals intact. | (Ye) | No |
| 4 | Chain of Custody in plastic. | (Fes) | No |
| 5 | Chain of Custody filled out properly. | (es) | No |
| 6 | Client signed Chain of Custody. | (Fes) | No |
| 7 | Samples shipped on ice. If no, temperature of cooler: | (Page) | No |
| 8 | All bottles sealed. | Yes | (No) |
| 9 | All bottles received intact. | (F83) | No No |
| 10 | Labels in good condition and complete. | (3) | No |
| 11 | Sample labels agree with Chain of Custody. | (es) | No |
| 12 | Correct containers used. | (Yes | No |
| 13 | Correct preservative used. | Yes | No |
| 14 | Sufficient sample provided. | (Pes) | No |
| 15 | Bubbles absent from VOA. | (es) | No |
| 16 | Comments (use corrective action form if necessary): | | |
| | | | |

<sup>\*\*</sup> If client or project manager need to be notify for any reason, please use the Case Narrative/Corrective Action green form.

| Fedex. USA Airbill Tracking 9725655461 | FedEx Retrieval Copy
248 1000 \$3761597 6078 |
|--|--|
| Sender's | Service Delivery commitment may be later in some 50 s IndEx Priority Overnight 5 FedEx Stank and Overnight (Next business as Embound) FedEx Govt. Overnight 8 FedEx 2Day FedEx Stank and |
| 2 Your Internal Billing Reference Information To Recipient's Janiu McKiHrick Phone 1972 1238 - 5591 Company ITS Environmental Laboratories Address 1089 E. Collins Rlvd. #100 | Does this shipment contain dangerous goods? Yes Y |
| City Pichardse State TX 7508 | Credit Card No. Total Packages Total Weight Total Open Street Conditions on CLARED YALUE AND LIMIT OF LIABILITY section for harther information Total Charges Street Conditions on CLARED YALUE AND LIMIT OF LIABILITY section for harther information Total Charges Street Credit Card Auth. Total Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street Conditions on Charges Street |

Intertek Testing Services NA Inc. 1089 East Collins Boulevard Richardson, TX 75081 Telephone (972) 238-5591 Fax (972) 238-5592



ANALYTICAL REPORT

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

PROJECT: 726876.24120 Gunter Annex

Included in this data package are the analytical results for the sample group which you have submitted to Intertek Testing Services for analysis. These results are representative of the samples as received by the laboratory.

The information contained herein has undergone extensive review and is deemed accurate and complete. Sample analysis and quality control were performed in accordance with all applicable protocols. Please refrain from reproducing this report except in its entirety.

If you have any questions regarding this report and its associated materials please call your Project Manager at (214) 238-5591.

We appreciate the opportunity to serve you and look forward to providing continued service in the future.

Martin Veffus General Manager

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-1 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY: JXA
ANALYZED ON: 16-JUL-1997
DILUTION FACTOR: 1
METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.42 mg/Kg | < 1.42 mg/Kg | U |
| Acenaphthylene | 1.82 mg/Kg | < 1.82 mg/Kg | U |
| Anthracene | 0.521 mg/Kg | < 0.521 mg/Kg | U |
| Benzo(a)anthracene | 0.0107 mg/Kg | < 0.0107 mg/Kg | U |
| Benzo(a)pyrene | 0.0178 mg/Kg | < 0.0178 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0142 mg/Kg | < 0.0142 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0592 mg/Kg | < 0.0592 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0130 mg/Kg | < 0.0130 mg/Kg | U |
| Chrysene | 0.118 mg/Kg | < 0.118 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0237 mg/Kg | < 0.0237 mg/Kg | U |
| Fluoranthene | 0.166 mg/Kg | < 0.166 mg/Kg | U |
| Fluorene | 0.166 mg/Kg | < 0.166 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0355 mg/Kg | < 0.0355 mg/Kg | U |
| Naphthalene | 1.42 mg/Kg | < 1.42 mg/Kg | U |

REPORT NUMBER : D97-8568-1 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBONS | 5 | | | |
|-----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.498 mg/Kg | < | 0.498 mg/Kg | U |
| Pyrene | 0.213 mg/Kg | < | 0.213 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.237 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-1 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD: EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997 ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1 QC BATCH NO : 1-071797A

| TEST REQUESTED | DETECTION LI | .IMIT | ļ | RESULTS | | FLAG |
|-------------------------|--------------|-------|---|---------|-------|------|
| Benzene | 0.001 mg | ng/Kg | < | 0.001 п | ng/Kg | U |
| Toluene | 0.002 mg | ng/Kg | < | 0.002 п | ng/Kg | u |
| Ethyl benzene | 0.002 mg | ng/Kg | < | 0.002 m | ng/Kg | U |
| m,p-Xylene | 0.002 mg | ng/Kg | < | 0.002 π | ng/Kg | U |
| o-Xylene | 0.002 mg | ng/Kg | < | 0.002 m | ng/Kg | U |
| Bromofluorobenzene (SS) | | | | 0.063 m | ng/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-1

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.8 mg/Kg | 7.6 mg/Kg | J |
| Triacontane (SS) | | 8.68 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-1 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION: Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

OC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | , | | - |
|-----------------------------|-----------------|--------------|--------------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.18 mg/Kg | < 1.18 mg/Kg | U |
| Fluorobenzene (SS) | | 0.059 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-1

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 2 mg/Kg | 16 mg/Kg | D |

Dilution Factor: 10
Prepared using EPA 3051 on 15-JUL-1997 by CEL
Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-1

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| | DETECTION | LIMIT | RESULTS | FLAG |
|----|-----------|-------|---------------------------|------|
| /1 | 0.01 | × | 84.4 % | · . |
| | /1 | | DETECTION LIMIT /1 0.01 % | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-2 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-20#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | · | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaph thene | 1.29 mg/Kg | < 1.29 mg/Kg | U |
| Acenaphthylene | 1.65 mg/Kg | < 1.65 mg/Kg | U |
| Anthracene | 0.472 mg/Kg | < 0.472 mg/Kg | U |
| Benzo(a)anthracene | 0.0097 mg/Kg | < 0.0097 mg/Kg | U |
| Benzo(a)pyrene | 0.0161 mg/Kg | < 0.0161 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0129 mg/Kg | < 0.0129 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0537 mg/Kg | < 0.0537 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0118 mg/Kg | < 0.0118 mg/Kg | U |
| Chrysene | 0.107 mg/Kg | < 0.107 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0215 mg/Kg | < 0.0215 mg/Kg | U |
| Fluoranthene | 0.150 mg/Kg | < 0.150 mg/Kg | U |
| Fluorene | 0.150 mg/Kg | < 0.150 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0322 mg/Kg | < 0.0322 mg/Kg | U |
| Naphthalene | 1.29 mg/Kg | < 1.29 mg/Kg | U |

REPORT NUMBER : D97-8568-2 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.451 mg/Kg | < | 0.451 mg/Kg | U |
| Pyrene | 0.193 mg/Kg | < | 0.193 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.244 mg/Kg | |



DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-2 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-20#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997 ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

OC BATCH NO : 1-071797A

| BTEX ANALYSIS | • | | |
|-------------------------|-----------------|---------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | < 0.001 mg/Kg | υ |
| Toluene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < 0.002 mg/Kg | υ |
| m,p-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | υ |
| o-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | · U |
| Bromofluorobenzene (SS) | | 0.058 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-2 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-20#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.7 mg/Kg | 6.8 mg/Kg | J |
| Triacontane (SS) | | 7.26 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-2 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-20#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | | |
|-----------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.07 mg/Kg | < | 1.07 mg/Kg | U |
| Fluorobenzene (SS) | | | 0.050 mg/Kg | |



DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-2

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-20#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | |
|----------------|-----------------|-----------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Lead /1 | 0.4 mg/Kg | 1.3 mg/Kg | D |

Dilution Factor : 2

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F



DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-2 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-20#

: N1#(0-0') PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
|----------------|----|-----------------|---------|------|
| Total Solids | /1 | 0.01 % | 93.2 % | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-3 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997
PREPARATION METHOD: EPA 3550A
PREPARED BY: CLT
PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | <u> </u> | | |
|-----------------------------------|---------------|----------|--------------|------|
| TEST REQUESTED | DETECTION LIM | 417 | RESULTS | FLAG |
| Acenaph thene | 1.33 mg/ | /Kg · | 1.33 mg/Kg | U |
| Acenaphthylene | 1.70 mg/ | /Kg · | 1.70 mg/Kg | U |
| Anthracene | 0.486 mg/ | /Kg - | 0.486 mg/Kg | U |
| Benzo(a)anthracene | 0.0099 mg/ | ∕Kg ← | 0.0099 mg/Kg | U |
| Benzo(a)pyrene | 0.0166 mg/ | ∕Kg < | 0.0166 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0133 mg/ | ′Kg < | 0.0133 mg/Kg | υ |
| Benzo(g,h,i)perylene | 0.0553 mg/ | ′Kg < | 0.0553 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0122 mg/ | ′Kg < | 0.0122 mg/Kg | U |
| Chrysene | 0.111 mg/ | ′Kg < | 0.111 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0221 mg/ | ′Kg < | 0.0221 mg/Kg | U |
| Fluoranthene | 0.155 mg/ | ′Kg < | 0.155 mg/Kg | U |
| Fluorene | 0.155 mg/ | ′Kg < | 0.155 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0332 mg/ | ′Kg < | 0.0332 mg/Kg | U |
| Naphthalene | 1.33 mg/l | 'Kg < | 1.33 mg/Kg | U |



REPORT NUMBER : D97-8568-3 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | | |
|-----------------------------------|-----------------|---|-------------|----------------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.464 mg/Kg | < | 0.464 mg/Kg | U |
| Pyrene | 0.199 mg/Kg | < | 0.199 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.262 mg/Kg | - |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-3 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997 ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | · | | |
|-------------------------|-----------------|---------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | < 0.001 mg/Kg | U |
| Toluene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| o-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | 0.055 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-3

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.0 mg/Kg | 7.0 mg/Kg | J |
| Triacontane (SS) | | 8.50 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-3 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | | |
|-----------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.10 mg/Kg | < | 1.10 mg/Kg | U |
| Fluorobenzene (SS) | | | 0.053 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-3

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | • | | |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 1.1 mg/Kg | 5.9 mg/Kg | D |

Dilution Factor : 5

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F



DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-3

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
|----------------|----|-----------------|---------|------|
| Total Solids | /1 | 0.01 % | 90.5 % | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-4

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-21# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY: JXA
ANALYZED ON: 16-JUL-1997
DILUTION FACTOR: 1
METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.28 mg/Kg | < 1.28 mg/Kg | U |
| Acenaphthylene | 1.65 mg/Kg | < 1.65 mg/Kg | u |
| Anthracene | 0.470 mg/Kg | < 0.470 mg/Kg | U |
| Benzo(a)anthracene | 0.0096 mg/Kg | < 0.0096 mg/Kg | U |
| Benzo(a)pyrene | 0.0160 mg/Kg | < 0.0160 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0128 mg/Kg | < 0.0128 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0534 mg/Kg | < 0.0534 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0118 mg/Kg | < 0.0118 mg/Kg | U |
| Chrysene | 0.107 mg/Kg | < 0.107 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0214 mg/Kg | < 0.0214 mg/Kg | U |
| Fluoranthene | 0.150 mg/Kg | < 0.150 mg/Kg | U |
| Fluorene | 0.150 mg/Kg | < 0.150 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0320 mg/Kg | < 0.0320 mg/Kg | U |
| Naphthalene | 1.28 mg/Kg | < 1.28 mg/Kg | U |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-4

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : MGK
PREPARED ON : 18-JUL-1997
ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|---------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | < 0.001 mg/Kg | U |
| Toluene | 0.002 mg/Kg | < 0.002 mg/Kg | υ |
| Ethyl benzene | 0.002 mg/Kg | < 0.002 mg/Kg | υ |
| m,p-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| o-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | 0.059 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-4 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.7 mg/Kg | 6.0 mg/Kg | J |
| Triacontane (SS) | | 7.53 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-4

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | *************************************** | | |
|-----------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.07 mg/Kg | < | 1.07 mg/Kg | y U |
| Fluorobenzene (SS) | | | 0.051 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-4

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | - |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 0.4 mg/Kg | 2.5 mg/Kg | D |

Dilution Factor: 2 Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 17-JUL-1997 by GGD QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-4

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB02-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| RESULTS | FLAG |
|---------|------|
| 93.6 % | ٠. |
| | |

Analyzed using ASTM D2216 mod. on 16-JUL-1997 by SAB

QC Batch No : 0716221607

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-5 REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT
PREPARED ON : 15-JUL-1997
ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 16-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | • | | | | | - |
|-----------------------------------|-----------|-------|----|---------|-------|------|
| TEST REQUESTED | DETECTION | LIMIT | | RESULTS | | FLAG |
| Acenaphthene | 1.35 | mg/Kg | < | 1.35 | mg/Kg | U |
| Acenaphthylene | 1.73 | mg/Kg | < | 1.73 | mg/Kg | U |
| Anthracene | 0.493 | mg/Kg | < | 0.493 | mg/Kg | U |
| Benzo(a)anthracene | 0.0101 | mg/Kg | < | 0.0101 | mg/Kg | U |
| Benzo(a)pyrene | 0.0168 | mg/Kg | .< | 0.0168 | mg/Kg | U |
| Benzo(b)fluoranthene | 0.0135 | mg/Kg | < | 0.0135 | mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0561 | mg/Kg | < | 0.0561 | mg/Kg | U |
| Benzo(k)fluoranthene | 0.0123 | mg/Kg | < | 0.0123 | mg/Kg | U |
| Chrysene | 0.112 | mg/Kg | < | 0.112 | mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0224 | mg/Kg | < | 0.0224 | mg/Kg | U |
| Fluoranthene | 0.157 | mg/Kg | < | 0.157 | mg/Kg | U |
| Fluorene | 0.157 | mg/Kg | < | 0.157 | mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0336 | mg/Kg | < | 0.0336 | mg/Kg | U |
| Naphthalene | 1.35 | mg/Kg | < | 1.35 | mg/Kg | U |

REPORT NUMBER : D97-8568-5 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|-------------|-------------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.471 mg/Kg | < | 0.471 mg/Kg | U |
| Pyrene | 0.202 mg/Kg | < | 0.202 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.265 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-5

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : RFG

PREPARED BI : RFG
PREPARED ON : 22-JUL-1997
ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 22-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 25-072197

| BTEX ANALYSIS | | | | | |
|-------------------------|-----------------|---------------|------|--|--|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG | | |
| Benzene | 0.001 mg/Kg | < 0.001 mg/Kg | U | | |
| Toluene | 0.002 mg/Kg | < 0.002 mg/Kg | U | | |
| Ethyl benzene | 0.002 mg/Kg | < 0.002 mg/Kg | U | | |
| m,p-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U | | |
| o-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U | | |
| Bromofluorobenzene (SS) | | 0.068 mg/Kg | | | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-5

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYSIS METROD: EFA COLO.,
ANALYZED BY: VHL
ANALYZED ON: 17-JUL-1997
DILUTION FACTOR: 1
METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.2 mg/Kg | 6.1 mg/Kg | J |
| Triacontane (SS) | | 7.83 mg/Kg | İ |

REPORT NUMBER : D97-8568-4 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.449 mg/Kg | < | 0.449 mg/Kg | U |
| Pyrene | 0.192 mg/Kg | < | 0.192 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.246 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-5

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030 PREPARED BY : RFG

PREPARED ON: 22-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 22-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 26-072197

| TOTAL VOLATILE HYDROCARBONS | | | | |
|-----------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.12 mg/Kg | < | 1.12 mg/Kg | U |
| Fluorobenzene (SS) | | | 0.050 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-5

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-16#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 1.1 mg/Kg | 3.7 mg/Kg | D |

Dilution Factor : 5

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 17-JUL-1997 by GGD

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-5

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

81503

: Grand JCT, CO ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-16#

: N1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997

| MISCELLANEOUS ANALYSES | | | | |
|---|--------|-----------------|---------|---------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Total Solids | /1 | 0.01 % | 89.2 % | |
| Analyzed using ASTM D2216 mod. on
QC Batch No : 0716221607 | 16-JUL | -1997 by SAB | | <u></u> |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-6

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 3550A

PREPARED BY: CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD: EPA 8310 PR /1

ANALYZED BY: JXA

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.26 mg/Kg | < 1.26 mg/Kg | U |
| Acenaphthylene | 1.62 mg/Kg | < 1.62 mg/Kg | U |
| Anthracene | 0.464 mg/Kg | < 0.464 mg/Kg | U |
| Benzo(a)anthracene | 0.0095 mg/Kg | < 0.0095 mg/Kg | υ |
| Benzo(a)pyrene | 0.0158 mg/Kg | < 0.0158 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0126 mg/Kg | < 0.0126 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0527 mg/Kg | < 0.0527 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0116 mg/Kg | < 0.0116 mg/Kg | U |
| Chrysene | 0.105 mg/Kg | < 0.105 mg/Kg | υ |
| Dibenz(a,h)anthracene | 0.0211 mg/Kg | < 0.0211 mg/Kg | U |
| Fluoranthene | 0.148 mg/Kg | < 0.148 mg/Kg | U |
| Fluorene | 0.148 mg/Kg | < 0.148 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0316 mg/Kg | < 0.0316 mg/Kg | U |
| Naphthalene | 1.26 mg/Kg | < 1.26 mg/Kg | U |

REPORT NUMBER : D97-8568-6 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | · | | - No. 2 |
|----------------------------------|-----------------|---|-------------|---------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.443 mg/Kg | < | 0.443 mg/Kg | U |
| Pyrene | 0.190 mg/Kg | < | 0.190 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.258 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-6 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 5030
PREPARED BY: MGK
PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
|-------------------------|-----------------|---|-------------|------|
| Benzene | 0.001 mg/Kg | < | 0.001 mg/Kg | U |
| Toluene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | υ |
| o-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | | 0.057 mg/Kg | - |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-6 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD: EPA 3550A

PREPARED BY : CLT
PREPARED ON : 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.5 mg/Kg | 8.1 mg/Kg | J |
| Triacontane (SS) | | 7.79 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-6

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030
PREPARED BY : MGK
PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|--------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.05 mg/Kg | < 1.05 mg/Kg | U |
| Fluorobenzene (SS) | | 0.051 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-6 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 0.2 mg/Kg | 1.7 mg/Kg | |

Dilution Factor: 1

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 17-JUL-1997 by GGD

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-6

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

81503

ADDRESS: 257A 28 Rd. : Grand JCT, CO ATTENTION: Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| IT RESULTS | FLAG |
|------------|--------|
| "2002.10 | FLAG |
| 94.9 % | |
| _ | 94.9 % |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-7 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS: GU-SB03-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997
PREPARATION METHOD: EPA 3550A
PREPARED BY: CLT
PREPARED ON: 15-JUL-1997
ANALYSIS METHOD: EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.30 mg/Kg | < 1.30 mg/Kg | U |
| Acenaphthylene | 1.67 mg/Kg | < 1.67 mg/Kg | U |
| Anthracene | 0.477 mg/Kg | < 0.477 mg/Kg | ; U |
| Benzo(a)anthracene | 0.0098 mg/Kg | 0.0358 mg/Kg | |
| Benzo(a)pyrene | 0.0163 mg/Kg | 0.0195 mg/Kg | |
| Benzo(b)fluoranthene | 0.0130 mg/Kg | < 0.0130 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0542 mg/Kg | < 0.0542 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0119 mg/Kg | < 0.0119 mg/Kg | U |
| Chrysene | 0.108 mg/Kg | < 0.108 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0217 mg/Kg | < 0.0217 mg/Kg | U |
| Fluoranthene | 0.152 mg/Kg | 0.177 mg/Kg | |
| Fluorene | 0.152 mg/Kg | < 0.152 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0325 mg/Kg | < 0.0325 mg/Kg | U |
| Naphthalene | 1.30 mg/Kg | < 1.30 mg/Kg | U |

· REPORT NUMBER : D97-8568-7 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | IS | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.456 mg/Kg | < | 0.456 mg/Kg | U |
| Pyrene | 0.195 mg/Kg | < | 0.195 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.294 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-7

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1 ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 500

METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | | | | |
|-------------------------|----------|---------|---|---------|-------|------|
| TEST REQUESTED | DETECTIO | N LIMIT | | RESULTS | | FLAG |
| Benzene | 0.5 | mg/Kg | < | 0.5 | mg/Kg | DU |
| Toluene | 1.1 | mg/Kg | < | 1.1 | mg/Kg | DU |
| Ethyl benzene | 1.1 | mg/Kg | < | 1.1 | mg/Kg | DU |
| m,p-Xylene | 1.1 | mg/Kg | < | 1.1 | mg/Kg | DU |
| o-Xylene | 1.1 | mg/Kg | < | 1.1 | mg/Kg | DU |
| Bromofluorobenzene (SS) | | | | 33.6 | mg/Kg | D |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-7

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A
PREPARED BY : CLT
PREPARED ON : 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.8 mg/Kg | 106 mg/Kg | |
| Triacontane (SS) | | 7.77 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-7

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd. : Grand JCT, CO

81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 500

METHOD FACTOR : 1 QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | • |
|-----------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 542 mg/Kg | 443 mg/Kg | DJ |
| Fluorobenzene (SS) | | 19.4 mg/Kg | D |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-7

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | |
|----------------|-----------------|---------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 2 mg/Kg | 3 mg/Kg | D |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-7

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB03-23#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 8-JUL-1997

| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
|----------------|----|-----------------|---------|------|
| Total Solids | /1 | 0.01 % | 92.2 % | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-8

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB04-11#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A PREPARED BY : CLT PREPARED ON : 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.49 mg/Kg | < 1.49 mg/Kg | U |
| Acenaphthylene | 1.91 mg/Kg | < 1.91 mg/Kg | U |
| Anthracene | 0.545 mg/Kg | < 0.545 mg/Kg | U |
| Benzo(a)anthracene | 0.0112 mg/Kg | < 0.0112 mg/Kg | U |
| Benzo(a)pyrene | 0.0186 mg/Kg | < 0.0186 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0149 mg/Kg | < 0.0149 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0620 mg/Kg | < 0.0620 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0136 mg/Kg | < 0.0136 mg/Kg | U |
| Chrysene | 0.124 mg/Kg | < 0.124 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0248 mg/Kg | < 0.0248 mg/Kg | U |
| Fluoranthene | 0.173 mg/Kg | < 0.173 mg/Kg | υ |
| Fluorene | 0.173 mg/Kg | < 0.173 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0372 mg/Kg | < 0.0372 mg/Kg | U |
| Naphthalene | 1.49 mg/Kg | < 1.49 mg/Kg | U |

REPORT NUMBER : D97-8568-8

ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.520 mg/Kg | < | 0.520 mg/Kg | U |
| Pyrene | 0.223 mg/Kg | < | 0.223 mg/Kg | υ |
| p-Terphenyl (SS) | | | 0.271 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-8

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB04-11#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997 ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY: MKS
ANALYZED ON: 18-JUL-1997
DILUTION FACTOR: 5
METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|---------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.006 mg/Kg | < 0.006 mg/Kg | DU |
| Toluene | 0.012 mg/Kg | < 0.012 mg/Kg | DU |
| Ethyl benzene | 0.012 mg/Kg | < 0.012 mg/Kg | DU |
| m,p-Xylene | 0.012 mg/Kg | < 0.012 mg/Kg | DU |
| o-Xylene | 0.012 mg/Kg | < 0.012 mg/Kg | DU |
| Bromofluorobenzene (SS) | | 0.372 mg/Kg | D |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-8

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB04-11#

: N1#(0-0') PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD: EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 12.4 mg/Kg | 10.5 mg/Kg | J |
| Triacontane (SS) | | 8.85 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-8

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB04-11# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 50 METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 62.0 mg/Kg | 23.5 mg/Kg | DJ |
| Fluorobenzene (SS) | | 2.66 mg/Kg | D |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-8

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB04-11#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | |
|----------------|-----------------|----------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Lead /1 | 2 mg/Kg | 20 mg/Kg | D. , |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-8

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB04-11#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| | | | | |
|----------------|----|-----------------|---------|-------------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Total Solids | /1 | 0.01 % | 80.7 % | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-9

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-16#

: N1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997
PREPARATION METHOD: EPA 3550A
PREPARED BY: CLT
PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | · |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.26 mg/Kg | < 1.26 mg/Kg | U |
| Acenaphthylene | 1.62 mg/Kg | < 1.62 mg/Kg | U |
| Anthracene | 0.463 mg/Kg | < 0.463 mg/Kg | U |
| Benzo(a)anthracene | 0.0095 mg/Kg | < 0.0095 mg/Kg | U |
| Benzo(a)pyrene | 0.0158 mg/Kg | < 0.0158 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0126 mg/Kg | < 0.0126 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0526 mg/Kg | < 0.0526 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0116 mg/Kg | < 0.0116 mg/Kg | U |
| Chrysene | 0.105 mg/Kg | < 0.105 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0211 mg/Kg | < 0.0211 mg/Kg | U |
| Fluoranthene | 0.147 mg/Kg | < 0.147 mg/Kg | U |
| Fluorene | 0.147 mg/Kg | < 0.147 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0316 mg/Kg | < 0.0316 mg/Kg | U |
| Naphthalene | 1.26 mg/Kg | < 1.26 mg/Kg | U |

REPORT NUMBER : D97-8568-9 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.442 mg/Kg | < | 0.442 mg/Kg | U |
| Pyrene | 0.189 mg/Kg | < | 0.189 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.243 mg/Kg | |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-9

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 5030
PREPARED BY: MGK
PREPARED ON: 18-JUL-1997
ANALYSIS METHOD: EPA 8020 PR /1
ANALYZED BY: MKS
ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| TEST REQUESTED | DETECTION LIMIT | RESULTS | | FLAG |
|-------------------------|-----------------|---------|-------------|------|
| Benzene | 0.001 mg/Kg | < | 0.001 mg/Kg | U |
| Toluene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| o-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | | 0.059 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-9

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-16# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.5 mg/Kg | 7.7 mg/Kg | J |
| Triacontane (SS) | | 7.38 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-9

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997
PREPARATION METHOD: EPA 5030
PREPARED BY: MGK
PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | | |
|-----------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.05 mg/Kg | < | 1.05 mg/Kg | U |
| Fluorobenzene (SS) | | | 0.046 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-9

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 1.1 mg/Kg | 3.0 mg/Kg | D |

Dilution Factor: 5

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-9 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| MISCELLANEOUS ANALYSES | · | | | |
|------------------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Total Solids | /1 | 0.01 % | 95.0 % | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-10

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | | | ···, | |
|-----------------------------------|-------------|-----------------|---|---------|-------|---|
| TEST REQUESTED | DETECTION I | DETECTION LIMIT | | RESULTS | | |
| Acenaphthene | 1.39 | ng/Kg | < | 1.39 | mg/Kg | U |
| Acenaphthylene | 1.78 | ng/Kg | < | 1.78 | mg/Kg | U |
| Anthracene | 0.508 | ng/Kg | < | 0.508 | mg/Kg | U |
| Benzo(a)anthracene | 0.0104 m | ng/Kg | | 0.455 | mg/Kg | |
| Benzo(a)pyrene | 0.0173 n | ng/Kg | | 0.364 | mg/Kg | |
| Benzo(b)fluoranthene | 0.0139 n | ng/Kg | | 0.318 | mg/Kg | |
| Benzo(g,h,i)perylene | 0.0577 n | ng/Kg | | 0.206 | mg/Kg | |
| Benzo(k)fluoranthene | 0.0127 m | ng/Kg | | 0.141 | mg/Kg | |
| Chrysene | 0.115 n | ng/Kg | | 0.382 | mg/Kg | |
| Dibenz(a,h)anthracene | 0.0231 n | ng/Kg | | 0.0243 | mg/Kg | |
| Fluoranthene | 0.162 m | ng/Kg | | 2.09 | mg/Kg | |
| Fluorene | 0.162 m | ng/Kg | < | 0.162 | mg/Kg | υ |
| Indeno(1,2,3-cd)pyrene | 0.0346 n | ng/Kg | | 0.184 | mg/Kg | |
| Naphthalene | 1.39 m | ng/Kg | < | 1.39 | mg/Kg | U |

REPORT NUMBER : D97-8568-10 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | |
|----------------------------------|-----------------|---------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Phenanthrene | 0.485 mg/Kg | < 0.485 mg/Ks | U |
| Pyrene | 0.208 mg/Kg | 1.48 mg/Kg | 3 |
| p-Terphenyl (SS) | | 0.271 mg/Kg | 1 |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-10

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1000

METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | | | | |
|-------------------------|-----------------|-------|---------|----|-------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | | | FLAG |
| Benzene | 1 | mg/Kg | | 1 | mg/Kg | DJ |
| Toluene | 2 | mg/Kg | | 2 | mg/Kg | DJ |
| Ethyl benzene | 2 | mg/Kg | < | 2 | mg/Kg | DU |
| m,p-Xylene | 2 | mg/Kg | | 12 | mg/Kg | D |
| o-Xylene | 2 | mg/Kg | | 16 | mg/Kg | D |
| Bromofluorobenzene (SS) | | | | 75 | mg/Kg | D |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-10

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 8020 C1 /1

ANALYZED BY : MKS

ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1000

METHOD FACTOR : 1 QC BATCH NO : 1-071797A

| | | ~ | | | | |
|-------------------------|-----------------|--------------|---|---------|-------|----|
| TEST REQUESTED | DETECTION LIMIT | | | RESULTS | | |
| Benzene | 1 | mg/Kg | | 1 | mg/Kg | DJ |
| Toluene | 2 | mg/Kg | | 2 | mg/Kg | ρJ |
| Ethyl benzene | . 2 | mg/Kg | < | 2 | mg/Kg | DU |
| m,p-Xylene | 2 | mg/Kg | | 12 | mg/Kg | D |
| o-Xylene | 2 | mg/Kg | | 16 | mg/Kg | D |
| Bromofluorobenzene (SS) | | | | 75 | mg/Kg | D |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-10

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY: RFG

PREPARED ON: 22-JUL-1997

ANALYSIS METHOD : EPA 8020 C2 /1

ANALYZED BY : MKS

ANALYZED ON: 22-JUL-1997

DILUTION FACTOR: 1000

METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | | |
|-------------------------|-----------------|----------|------|--|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG | |
| Toluene | 2 mg/Kg | 7 mg/Kg | D | |
| m,p-Xylene | 2 mg/Kg | 26 mg/Kg | D | |
| o-Xylene | 2 mg/Kg | 11 mg/Kg | D | |
| Bromofluorobenzene (SS) | | 74 mg/Kg | D | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-10

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-23# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD: EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | OETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.5 mg/Kg | 292 mg/Kg | |
| Triacontane (SS) | | 8.63 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-10

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1000

METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | | | . |
|-----------------------------|-----------------|-----|---------|-------|--------------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | | FLAG |
| Total Volatile Hydrocarbons | 1150 mg | /Kg | 851 | mg/Kg | DJ |
| Fluorobenzene (SS) | | | 41 | mg/Kg | D |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-10

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 2 mg/Kg | 6 mg/Kg | D |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-10

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB05-23#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
|----------------|----|-----------------|---------|------|
| Total Solids | /1 | 0.01 % | 86.6 % | |

DATE RECEIVED: 10-JUL-1997

REPORT NUMBER : D97-8568-11

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 3550A
PREPARED BY: CLT
PREPARED ON: 15-JUL-1997
ANALYSIS METHOD: EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| TEST REQUESTED | DETECTION LIMIT | | RESULTS | |
|------------------------|-----------------|---|--------------|------|
| | 1.36 mg/Kg | | 1.36 mg/Kg | FLAG |
| Acenaphthene | | | | |
| Acenaphthylene | 1.75 mg/Kg | < | 1.75 mg/Kg | U |
| Anthracene | 0.499 mg/Kg | | 0.499 mg/Kg | U |
| Benzo(a)anthracene | 0.0102 mg/Kg | < | 0.0102 mg/Kg | U |
| Benzo(a)pyrene | 0.0170 mg/Kg | < | 0.0170 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0136 mg/Kg | < | 0.0136 mg/Kg | υ |
| Benzo(g,h,i)perylene | 0.0567 mg/Kg | < | 0.0567 mg/Kg | υ |
| Benzo(k)fluoranthene | 0.0125 mg/Kg | < | 0.0125 mg/Kg | U |
| Chrysene | 0.113 mg/Kg | < | 0.113 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0227 mg/Kg | < | 0.0227 mg/Kg | U |
| Fluoranthene | 0.159 mg/Kg | < | 0.159 mg/Kg | U |
| Fluorene | 0.159 mg/Kg | < | 0.159 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0340 mg/Kg | < | 0.0340 mg/Kg | U |
| Naphthalene | 1.36 mg/Kg | < | 1.36 mg/Kg | U |

REPORT NUMBER : D97-8568-11 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.476 mg/Kg | < | 0.476 mg/Kg | U |
| Pyrene | 0.204 mg/Kg | < | 0.204 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.259 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-11

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : MGK
PREPARED ON : 18-JUL-1997 ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | • | |
|-------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | | 0.001 mg/Kg | J |
| Toluene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| o-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | | 0.062 mg/Kg | - |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-11 REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A
PREPARED BY : CLT
PREPARED ON : 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1 ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|-------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.3 mg/Kg | 8.8 mg/Kg | J |
| Triacontane (SS) | | 8.00 mg/Kg | ····· |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-11

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD: EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.13 mg/Kg | 0.273 mg/Kg | J |
| Fluorobenzene (SS) | | 0.050 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-11

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 1.1 mg/Kg | 4.8 mg/Kg | D |

Dilution Factor: 5

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-11

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-16#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 8-JUL-1997

| | | | | |
|----------------|-------------|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Total Solids | /1 | 0.01 % | 88.2 % | |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-12

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 15-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 17-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | | |
|-----------------------------------|-----------------|---|------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAC |
| Acenaphthene | 1.48 mg/Kg | < | 1.48 mg/ | Kg U |
| Acenaphthylene | 1.90 mg/Kg | < | 1.90 mg/ | Kg U |
| Anthracene | 0.543 mg/Kg | < | 0.543 mg/ | Kg U |
| Benzo(a)anthracene | 0.0111 mg/Kg | < | 0.0111 mg/ | Kg U |
| Benzo(a)pyrene | 0.0185 mg/Kg | < | 0.0185 mg/ | Kg U |
| Benzo(b)fluoranthene | 0.0148 mg/Kg | < | 0.0148 mg/ | Kg U |
| Benzo(g,h,i)perylene | 0.0617 mg/Kg | < | 0.0617 mg/ | Kg U |
| Benzo(k)fluoranthene | 0.0136 mg/Kg | < | 0.0136 mg/ | Kg U |
| Chrysene | 0.123 mg/Kg | < | 0.123 mg/ | Kg U |
| Dibenz(a,h)anthracene | 0.0247 mg/Kg | < | 0.0247 mg/ | Kg U |
| Fluoranthene | 0.173 mg/Kg | < | 0.173 mg/ | Kg U |
| Fluorene | 0.173 mg/Kg | < | 0.173 mg/ | Kg U |
| Indeno(1,2,3-cd)pyrene | 0.0370 mg/Kg | < | 0.0370 mg/ | Kg U |
| Naphthalene | 1.48 mg/Kg | < | 1.48 mg/ | Kg Ü |

REPORT NUMBER : D97-8568-12 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | s | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.519 mg/Kg | < | 0.519 mg/Kg | U |
| Pyrene | 0.222 mg/Kg | < | 0.222 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.280 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-12

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS ID MARKS : GU-SB06-21#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

OC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|---------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | < 0.001 mg/Kg | U |
| Toluene | 0.602 mg/Kg | < 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| o-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | 0.069 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-12

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-21#

: N1#(0-0') PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS · | FLAG |
| Total Extractable Hydrocarbons | 12.3 mg/Kg | 6.5 mg/Kg | J |
| Triacontane (SS) | | 8.60 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-12

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | | |
|-----------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.23 mg/Kg | < | 1.23 mg/Kg | U |
| Fluorobenzene (SS) | | | 0.056 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-12

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 1.2 mg/Kg | 6.3 mg/Kg | D |

Dilution Factor: 5

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 17-JUL-1997 by GGD

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-12

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB06-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
|----------------|----|-----------------|---------|------|
| Total Solids | /1 | 0.01 % | 81.0 % | - |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-13

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-11# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 15-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.42 mg/Kg | < 1.42 mg/Kg | U |
| Acenaphthylene | 1.82 mg/Kg | < 1.82 mg/Kg | U |
| Anthracene | 0.519 mg/Kg | < 0.519 mg/Kg | U |
| Benzo(a)anthracene | 0.0106 mg/Kg | < 0.0106 mg/Kg | U |
| Benzo(a)pyrene | 0.0177 mg/Kg | < 0.0177 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0142 mg/Kg | < 0.0142 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0590 mg/Kg | < 0.0590 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0130 mg/Kg | < 0.0130 mg/Kg | U |
| Chrysene | 0.118 mg/Kg | < 0.118 mg/Kg | u |
| Dibenz(a,h)anthracene | 0.0236 mg/Kg | < 0.0236 mg/Kg | U |
| Fluoranthene | 0.165 mg/Kg | < 0.165 mg/Kg | U |
| Fluorene | 0.165 mg/Kg | < 0.165 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0354 mg/Kg | < 0.0354 mg/Kg | U |
| Naphthalene | 1.42 mg/Kg | < 1.42 mg/Kg | U |

REPORT NUMBER : D97-8568-13 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|--------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.495 mg/Kg | < | 0.495 mg/Kg | U |
| Pyrene | 0.212 mg/Kg | < | 0.212 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.0434 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-13

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-11#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD: EPA 5030
PREPARED BY: MGK
PREPARED ON: 18-JUL-1997
ANALYSIS METHOD: EPA 8020 PR /1
ANALYZED BY: MKS
ANALYZED ON: 18-JUL-1997
DILUMINAL PACKED

DILUTION FACTOR : 1 METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | • | | | |
|-------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | < | 0.001 mg/Kg | U |
| Toluene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| o-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | | 0.063 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-13

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-11#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|------------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT. | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.8 mg/Kg | 7.2 mg/Kg | J |
| Triacontane (SS) | | 7.92 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-13

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-11#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|--------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.18 mg/Kg | < 1.18 mg/Kg | U |
| Fluorobenzene (SS) | | 0.058 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-13

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-11#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | |
|----------------|-----------------|---------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Lead /1 | 2 mg/Kg | 9 mg/Kg | D |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-13

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science.

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-11#

: N1#(0-0') PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| MISCELLANEOUS ANALYSES | | | | |
|------------------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Total Solids | /1 | 0.01 % | 84.8 % | |

Analyzed using ASTM D2216 mod. on 16-JUL-1997 by SAB

QC Batch No : 0716221608

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-14

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
|------------------------|-----------------|----------|--------------|------|
| Acenaphthene | 1.27 mg/Kg | ; < | 1.27 mg/Kg | υ |
| Acenaphthylene | 1.63 mg/Kg | ; < | 1.63 ing/Kg | υ |
| Anthracene | 0.467 mg/Kg | , | 0.467 mg/Kg | U |
| Benzo(a)anthracene | 0.0095 mg/Kg | , | 0.0095 mg/Kg | U |
| Benzo(a)pyrene | 0.0159 mg/Kg | , < | 0.0159 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0127 mg/Kg | , < | 0.0127 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0530 mg/Kg | , < | 0.0530 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0117 mg/Kg | , | 0.0117 mg/Kg | U |
| Chrysene | 0.106 mg/Kg | ; < | 0.106 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0212 mg/Kg | 9 < | 0.0212 mg/Kg | U |
| Fluoranthene | 0.148 mg/Kg | , < | 0.148 mg/Kg | U |
| Fluorene | 0.148 mg/Kg | , < | 0.148 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0318 mg/Kg | g < | 0.0318 mg/Kg | U |
| Naphthalene | 1.27 mg/Kg | , < | 1.27 mg/Kg | U |

REPORT NUMBER : D97-8568-14 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.445 mg/Kg | < | 0.445 mg/Kg | U |
| Pyrene | 0.191 mg/Kg | < | 0.191 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.258 mg/Kg | |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-14

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS ID MARKS : GU-SB07-21#

: N1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 1-071797A

| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
|-------------------------|-----------------|---|-------------|------|
| Benzene | 0.001 mg/Kg | < | 0.001 mg/Kg | U |
| Toluene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | | 0.001 mg/Kg | J |
| o-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | | 0.059 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-14

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS: GU-SB07-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.6 mg/Kg | 4.1 mg/Kg | J |
| Triacontane (SS) | | 7.94 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-14

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-21# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD: EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|--------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.06 mg/Kg | < 1.06 mg/Kg | U |
| Fluorobenzene (SS) | | 0.048 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-14

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 0.4 mg/Kg | 0.6 mg/Kg | D- |

Dilution Factor: 2

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-14

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

81503

: Grand JCT, CO ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
|----------------|----|-----------------|---------|------|
| Total Solids | /1 | 0.01 % | 94.3 % | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-15

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-16# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaph thene | 1.38 mg/Kg | < 1.38 mg/Kg | U |
| Acenaph thylene | 1.78 mg/Kg | < 1.78 mg/Kg | U |
| Anthracene | 0.508 mg/Kg | < 0.508 mg/Kg | U |
| Benzo(a)anthracene | 0.0104 mg/Kg | < 0.0104 mg/Kg | U |
| Benzo(a)pyrene | 0.0173 mg/Kg | < 0.0173 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0138 mg/Kg | < 0.0138 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0577 mg/Kg | < 0.0577 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0127 mg/Kg | < 0.0127 mg/Kg | U |
| Chrysene | 0.115 mg/Kg | < 0.115 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0231 mg/Kg | < 0.0231 mg/Kg | U |
| Fluoranthene | 0.161 mg/Kg | < 0.161 mg/Kg | U |
| Fluorene | 0.161 mg/Kg | < 0.161 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0346 mg/Kg | < 0.0346 mg/Kg | U |
| Naphthalene | 1.38 mg/Kg | < 1.38 mg/Kg | U |

REPORT NUMBER : D97-8568-15 ANALYSIS METHOD : EPA 8310 PR /1

PAGE · 2

| POLYNUCLEAR AROMATIC HYDROCARBON | s | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.484 mg/Kg | < | 0.484 mg/Kg | U |
| Pyrene | 0.208 mg/Kg | < | 0.208 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.246 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-15

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK
PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 1-071797A

| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
|-------------------------|-----------------|---|---------------------|------|
| Benzene | 0.601 mg/Kg | | 0.001 mg/Kg | J |
| Toluene | 0_002 mg/Kg | < | 0.002 mg/ Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | | 0.001 mg/Kg | J |
| o-Xylene | 0.002 mg/Kg | < | 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | | 0.063 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-15

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD: EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1 QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.5 mg/Kg | 6.5 mg/Kg | J |
| Triacontane (SS) | | 8.42 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-15

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|--------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.15 mg/Kg | < 1.15 mg/Kg | U |
| Fluorobenzene (SS) | | 0.053 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-15

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 2 mg/Kg | 5 mg/Kg | D |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-15

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd. : Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-16#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
|----------------|------|-----------------|---------|------|
| Total Solids | , /1 | 0.01 % | 86.7 % | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-16

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : AC142-60A

| TEST REQUESTED | DETECTION LIMI | IT | RESULTS | FLAG |
|------------------------|----------------|------|--------------|------|
| Acenaphthene | 1.58 mg/K | Kg < | 1.58 mg/Kg | U |
| Acenaphthylene | 2.03 mg/K | Kg < | 2.03 mg/Kg | U |
| Anthracene | 0.579 mg/K | Kg < | 0.579 mg/Kg | U |
| Benzo(a)anthracene | 0.0118 mg/K | Kg < | 0.0118 mg/Kg | U |
| Benzo(a)pyrene | 0.0197 mg/K | Kg < | 0.0197 mg/Kg | U |
| Benzo(b)fluoranthene | 0.0158 mg/K | Kg < | 0.0158 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0658 mg/K | Kg < | 0.0658 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0145 mg/K | Kg < | 0.0145 mg/Kg | U |
| Chrysene | 0.132 mg/K | Kg < | 0.132 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0263 mg/K | Kg < | 0.0263 mg/Kg | u |
| Fluoranthene | 0.184 mg/K | Kg < | 0.184 mg/Kg | U |
| Fluorene | 0.184 mg/K | Kg < | 0.184 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0395 mg/K | Kg < | 0.0395 mg/Kg | U |
| Naphthalene | 1.58 mg/K | Kq < | 1.58 mg/Kg | U |

REPORT NUMBER : D97-8568-16 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBONS | S | | | |
|-----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.553 mg/Kg | < | 0.553 mg/Kg | U |
| Pyrene | 0.237 mg/Kg | < | 0.237 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.301 mg/Kg | |

Results are reported on Dry Weight basis when applicable.

Intertek Testing Services NA Inc.

1089 East Collins Boulevard Richardson, TX 75081
Telephone (972) 238-5591 Fax (972) 238-5592

DATE RECEIVED: 10-JUL-1997

REPORT NUMBER : D97-8568-16

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-21#

: N1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 1-071797A

| TEST REQUESTED | DETECTION LIMIT | | RESULTS | | |
|-------------------------|-----------------|---|-------------|---|--|
| Benzene | 0.001 mg/Kg | < | 0.001 mg/Kg | υ | |
| Toluene | 0.003 mg/Kg | < | 0.003 mg/Kg | υ | |
| Ethyl benzene | 0.003 mg/Kg | < | 0.003 mg/Kg | U | |
| m,p-Xylene | 0.003 mg/Kg | < | 0.003 mg/Kg | U | |
| o-Xylene | 0.003 mg/Kg | < | 0.003 mg/Kg | U | |
| Bromofluorobenzene (SS) | | | 0.071 mg/Kg | | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-16

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 13.2 mg/Kg | 6.4 mg/Kg | J |
| Triacontane (SS) | | 9.68 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-16

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-21# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

OC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|--------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.32 mg/Kg | < 1.32 mg/Kg | U |
| Fluorobenzene (SS) | | 0.064 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-16

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-21#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 3 mg/Kg | 5 mg/Kg | ٥. |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-16

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB08-21#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 8-JUL-1997

| MISCELLANEOUS ANALYSES | | | | |
|------------------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Total Solids | /1 | 0.01 % | 76.0 % | · |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER: D97-8568-17

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : FIELDQC#

: TB1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD: EPA 5030

PREPARED BY : LLB

PREPARED ON: 16-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : CNA ANALYZED ON : 19-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 30071897AR

| TEST REQUESTED | DETECTIO | N LIMIT | | RESULT | 'S | FLAG |
|-------------------------|----------|---------|---|--------|------|------|
| Benzene | 2.0 | μg/L | < | 2.0 | μg/L | U |
| Toluene | 2.0 | μg/L | < | 2.0 | μg/L | U |
| Ethyl benzene | 2.0 | μg/L | < | 2.0 | μg/L | U |
| m,p-Xylene | 2.0 | μg/L | < | 2.0 | μg/L | U |
| o-Xylene | 2.0 | μg/L | < | 2.0 | μg/L | U |
| Bromofluorobenzene (SS) | | | | 55.4 | μg/L | |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-18

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| TEST REQUESTED | DETECTION | DETECTION LIMIT | | RESULTS | | |
|------------------------|-----------|-----------------|---|---------|-------|---|
| Acenaphthene | 1.20 | mg/Kg | < | 1.20 | mg/Kg | U |
| Acenaphthylene | 1.54 | mg/Kg | < | 1.54 | mg/Kg | U |
| Anthracene | 0.440 | mg/Kg | < | 0.440 | mg/Kg | U |
| Benzo(a)anthracene | 0.0090 | mg/Kg | < | 0.0090 | mg/Kg | U |
| Benzo(a)pyrene | 0.0150 | mg/Kg | < | 0.0150 | mg/Kg | U |
| Benzo(b)fluoranthene | 0.0120 | mg/Kg | < | 0.0120 | mg/Kg | υ |
| Benzo(g,h,i)perylene | 0.0500 | mg/Kg | < | 0.0500 | mg/Kg | U |
| Benzo(k)fluoranthene | 0.0110 | mg/Kg | < | 0.0110 | mg/Kg | U |
| Chrysene | 0.100 | mg/Kg | < | 0.100 | mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0200 | mg/Kg | < | 0.0200 | mg/Kg | U |
| Fluoranthene | 0.140 | mg/Kg | < | 0.140 | mg/Kg | U |
| Fluorene | 0.140 | mg/Kg | < | 0.140 | mg/Kg | υ |
| Indeno(1,2,3-cd)pyrene | 0.0300 | mg/Kg | < | 0.0300 | mg/Kg | U |
| Naphthalene | 1.20 | mg/Kg | < | 1.20 | mg/Kg | U |

REPORT NUMBER : D97-8568-18 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | s | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.420 mg/Kg | < | 0.420 mg/Kg | U |
| Pyrene | 0.180 mg/Kg | < | 0.180 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.239 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-18

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 10-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997 ANALYSIS METHOD : EPA 8020 PR /1
ANALYZED BY : MKS
ANALYZED ON : 18-JUL-1997
DILUTION FACTOR : 1

METHOD FACTOR : 1

QC BATCH NO : 1-071797A

| TEST REQUESTED | DETECTION L | LIMIT | | RESULTS | | FLAG |
|-------------------------|-------------|-------|---|---------|-------|------|
| Benzene | 0.001 m | ng/Kg | < | 0.001 | mg/Kg | U |
| Toluene | 0.002 m | ng/Kg | < | 0.002 | mg/Kg | U |
| Ethyl benzene | 0.002 m | ng/Kg | < | 0.002 | mg/Kg | U |
| m,p-Xylene | 0.002 m | ng/Kg | < | 0.002 | mg/Kg | U |
| o-Xylene | 0.002 m | ng/Kg | < | 0.002 | mg/Kg | U |
| Bromofluorobenzene (SS) | | | | 0.059 | mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-18

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABQC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD: EPA 3550A
PREPARED BY: CLT
PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.0 mg/Kg | 7.5 mg/Kg | J |
| Triacontane (SS) | | 7.57 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-18

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABQC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : MGK
PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1 ANALYZED BY : MKS ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|--------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.00 mg/Kg | < 1.00 mg/Kg | U |
| Fluorobenzene (SS) | | 0.046 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-18

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABQC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

| TOTAL METALS | | | | | |
|----------------|--------|-----------------|---|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | | RESULTS | FLAG |
| Lead |
/1 | 0.2 mg/Kg | < | 0.2 mg/Kg | U. |

Dilution Factor: 1

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 21-JUL-1997 by AH

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-19

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABQC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 10-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 15-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1
ANALYZED BY : JXA
ANALYZED ON : 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
|------------------------|-----------------|------------|------|
| Acenaphthene | 1.20 mg/Kg | 2.50 mg/Kg | |
| Acenaphthylene | 1.54 mg/Kg | 2.43 mg/Kg | |
| Anthracene | 0.440 mg/Kg | 2.36 mg/Kg | |
| Benzo(a)anthracene | 0.0090 mg/Kg | 2.91 mg/Kg | |
| Benzo(a)pyrene | 0.0150 mg/Kg | 2.78 mg/Kg | |
| Benzo(b)fluoranthene | 0.0120 mg/Kg | 2.78 mg/Kg | |
| Benzo(g,h,i)perylene | 0.0500 mg/Kg | 2.84 mg/Kg | |
| Benzo(k)fluoranthene | 0.0110 mg/Kg | 2.71 mg/Kg | |
| Chrysene | 0.100 mg/Kg | 2.76 mg/Kg | |
| Dibenz(a,h)anthracene | 0.0200 mg/Kg | 3.08 mg/Kg | |
| Fluoranthene | 0.140 mg/Kg | 2.82 mg/Kg | |
| Fluorene | 0.140 mg/Kg | 2.58 mg/Kg | |
| Indeno(1,2,3-cd)pyrene | 0.0300 mg/Kg | 2.61 mg/Kg | |
| Naphthalene | 1.20 mg/Kg | 2.76 mg/Kg | |

REPORT NUMBER : D97-8568-19 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | s | | |
|----------------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Phenanthrene | 0.420 mg/Kg | 2.49 mg/Kg | |
| Pyrene | 0.180 mg/Kg | 2.54 mg/Kg | |
| p-Terphenyl (SS) | | 0.262 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-19

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BS1#(0-0')

: BS1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 10-JUL-1997
PREPARATION METHOD: EPA 5030
PREPARED BY: MGK
PREPARED ON: 17-JUL-1997
ANALYSIS METHOD: EPA 8020 PR /1
ANALYZED BY: MKS
ANALYZED ON: 17-JUL-1997
DILUTION FACTOR: 1

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | *** |
|-------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | 0.048 mg/Kg | |
| Ethyl benzene | 0.002 mg/Kg | 0.052 mg/Kg | |
| Bromofluorobenzene (SS) | | 0.059 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-19

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.0 mg/Kg | 70.1 mg/Kg | |
| Triacontane (SS) | | 7.56 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-19

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : MGK PREPARED ON : 17-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | | |
|-----------------------------|-----------------|-------------|------|--|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG | |
| Total Volatile Hydrocarbons | 1.00 mg/Kg | 0.504 mg/Kg | J | |
| Fluorobenzene (SS) | | 0.046 mg/Kg | | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-19

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|-----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 0.2 mg/Kg | 1.8 mg/Kg | |

Dilution Factor : 1

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 17-JUL-1997 by GGD

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-20

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: MS1#(0-0')

PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|--------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.42 mg/Kg | 3.00 mg/Kg | |
| Acenaphthylene | 1.82 mg/Kg | 2.91 mg/Kg | |
| Anthracene | 0.521 mg/Kg | 2.78 mg/Kg | |
| Benzo(a)anthracene | 0.0107 mg/Kg | 3.44 mg/Kg | |
| Benzo(a)pyrene | 0.0178 mg/Kg | 3.27 mg/Kg | |
| Benzo(b)fluoranthene | 0.0142 mg/Kg | 3.27 mg/Kg | |
| Benzo(g,h,i)perylene | 0.0592 mg/Kg | 3.34 mg/Kg | |
| Benzo(k)fluoranthene | 0.0130 mg/Kg | 3.20 mg/Kg | |
| Chrysene | 0.118 mg/Kg | 3.28 mg/Kg | |
| Dibenz(a,h)anthracene | 0.0237 mg/Kg | . 3.65 mg/Kg | |
| Fluoranthene | 0.166 mg/Kg | 3.32 mg/Kg | |
| Fluorene | 0.166 mg/Kg | 3.08 mg/Kg | |
| Indeno(1,2,3-cd)pyrene | 0.0355 mg/Kg | 3.07 mg/Kg | |
| Naphthalene | 1.42 mg/Kg | 3.55 mg/Kg | _ |

REPORT NUMBER : D97-8568-20 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | |
|----------------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Phenanthrene | 0.498 mg/Kg | 2.95 mg/Kg | |
| Pyrene | 0.213 mg/Kg | 3.00 mg/Kg | |
| p-Terphenyl (SS) | | 0.295 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-20

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: MS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997 PREPARATION METHOD: EPA 5030

PREPARED BY : MGK PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | 0.063 mg/Kg | |
| Ethyl benzene | 0.002 mg/Kg | 0.070 mg/Kg | |
| Bromofluorobenzene (SS) | | 0.068 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-20

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: MS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON : 15-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.8 mg/Kg | 83.6 mg/Kg | |
| Triacontane (SS) | | 9.06 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-20

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: MS1#(0-0') PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY: MKS
ANALYZED ON: 18-JUL-1997
DILUTION FACTOR: 1

METHOD FACTOR : 1 QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.18 mg/Kg | 0.672 mg/Kg | J |
| Fluorobenzene (SS) | | 0.057 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-20

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: MS1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 2 mg/Kg | 9 mg/Kg | D. |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 17-JUL-1997 by GGD

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-20

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science: ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: MS1#(0-0')

PROJECT: 726876.24120 Gunter, Annex

DATE SAMPLED: 8-JUL-1997

| MISCELLANEOUS ANALYSES | | | | |
|------------------------|-----------------------|-----------------|--|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Total Solids | /1 | 0.01 % | 84.4 % | |
| Analyzed using ASTM (|)2216 mod. on 16-JUL- | -1997 by SAB | ······································ | |

QC Batch No : 0716221607

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-21

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10# : SD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-60A

| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
|------------------------|-----------------|------------|------|
| Acenaphthene | 1.42 mg/Kg | 2.99 mg/Kg | |
| Acenaphthylene | 1.82 mg/Kg | 2.95 mg/Kg | |
| Anthracene | 0.521 mg/Kg | 2.81 mg/Kg | |
| Benzo(a)anthracene | 0.0107 mg/Kg | 3.48 mg/Kg | |
| Benzo(a)pyrene | 0.0178 mg/Kg | 3.29 mg/Kg | |
| Benzo(b)fluoranthene | 0.0142 mg/Kg | 3.32 mg/Kg | |
| Benzo(g,h,i)perylene | 0.0592 mg/Kg | 3.41 mg/Kg | |
| Benzo(k)fluoranthene | 0.0130 mg/Kg | 3.26 mg/Kg | |
| Chrysene | 0.118 mg/Kg | 3.33 mg/Kg | |
| Dibenz(a,h)anthracene | 0.0237 mg/Kg | 3.71 mg/Kg | |
| Fluoranthene | 0.166 mg/Kg | 3.35 mg/Kg | |
| Fluorene | 0.166 mg/Kg | 3.10 mg/Kg | |
| Indeno(1,2,3-cd)pyrene | 0.0355 mg/Kg | 3.13 mg/Kg | |
| Naphthalene | 1.42 mg/Kg | 3.61 mg/Kg | |

REPORT NUMBER : D97-8568-21 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | |
|----------------------------------|------------------|-------------|------|
| TEST REQUESTED | DETECTION: LIMIT | RESULTS | FLAG |
| Phenanthrene | 0.498 mg/Kg | 2.97 mg/Kg | |
| Pyrene | 0.213 mg/Kg | 3.03 mg/Kg | |
| p-Terphenyl (SS) | | 0.301 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-21

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: SD1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997
PREPARATION METHOD: EPA 5030
PREPARED BY: MGK
PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | 0.064 mg/Kg | |
| Ethyl benzene | 0.002 mg/Kg | 0.070 mg/Kg | |
| Bromofluorobenzene (SS) | | 0.065 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-21

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10# : SD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 8-JUL-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 11.8 mg/Kg | 82.9 mg/Kg | |
| Triacontane (SS) | | 8.31 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-21

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: SD1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 8-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGK

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.18 mg/Kg | 0.647 mg/Kg | J |
| Fluorobenzene (SS) | | 0.057 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-21

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: SD1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997

| TOTAL METALS | | | | |
|----------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | /1 | 2 mg/Kg | 8 mg/Kg | D |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 17-JUL-1997 by GGD

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-21

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science: ADDRESS: 257A 28 Rd.

: Grand JCT, CO. 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB01-10#

: SD1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 8-JUL-1997

| MISCELLANEOUS ANALYSES | | | | |
|------------------------|----|-----------------|---------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Total Solids | /1 | 0.01 % | 84.4 % | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-22

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 10-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : CNA

PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : CNA ANALYZED ON : 19-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1 QC BATCH NO : 30071897AR

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 2.0 µg/L | < 2.0 μg/L | U |
| Toluene | 2.0 µg/L | < 2.0 μg/L | U |
| Ethyl benzene | 2.0 µg/L | < 2.0 μg/L | U |
| m,p-Xylene | 2.0 µg/L | < 2.0 μg/L | U |
| o-Xylene | 2.0 µg/L | < 2.0 μg/L | U |
| Bromofluorobenzene (SS) | | 53.0 μg/L | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-23

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD: EPA 5030 PREPARED BY: CNA PREPARED ON: 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : CNA ANALYZED ON : 19-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 30071897AR

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|-----------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 2.0 µg/L | 51.0 μg/L | |
| Ethyl benzene | 2.0 µg/L | 53.6 µg/L | |
| Bromofluorobenzene (SS) | | 49.8 μg/L | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-24

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS ID MARKS : LABQC#

: LB2#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 21-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : RFG

PREPARED ON: 21-JUL-1997 ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 21-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 25-072197

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|---------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | < 0.001 mg/Kg | U |
| Toluene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| Ethyl benzene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| m,p-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| o-Xylene | 0.002 mg/Kg | < 0.002 mg/Kg | U |
| Bromofluorobenzene (SS) | | 0.061 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-24

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS ID MARKS : LABQC#

: LB2#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 21-JUL-1997

PREPARATION METHOD : EPA 5030 PREPARED BY: RFG

PREPARED ON: 21-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON: 21-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 26-072197

| TOTAL VOLATILE HYDROCARBONS | | | | |
|-----------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.30 mg/Kg | < | 1.00 mg/Kg | U |
| Fluorobenzene (SS) | | | 0.047 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-25

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABQC#

: BS2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 21-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : RFG

PREPARED ON: 21-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY: MKS
ANALYZED ON: 21-JUL-1997
DILUTION FACTOR: 1
METHOD FACTOR: 1
QC BATCH NO: 25-072197

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | 0.044 mg/Kg | |
| Ethyl benzene | 0.002 mg/Kg | 0.051 mg/Kg | |
| Bromofluorobenzene (SS) | | 0.055 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-25

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BS2#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 21-JUL-1997

PREPARATION METHOD: EPA 5030
PREPARED BY: RFG
PREPARED ON: 21-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS ANALYZED ON : 21-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 26-072197

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.00 mg/Kg | 0.543 mg/Kg | J |
| Fluorobenzene (SS) | | 0.045 mg/Kg | |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-26

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 22-JUL-1997
PREPARATION METHOD: EPA 3550A
PREPARED BY: CLT
PREPARED ON: 15-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-60A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | | | |
|-----------------------------------|-------------|------|---------|-------|------|
| TEST REQUESTED | DETECTION L | IMIT | RESULTS | | FLAG |
| Acenaphthene | 1.20 mg | g/Kg | 2.52 | mg/Kg | |
| Acenaphthylene | 1.54 mg | g/Kg | 2.48 | mg/Kg | |
| Anthracene | 0.440 mg | g/Kg | 2.36 | mg/Kg | |
| Benzo(a)anthracene | 0.0090 mg | g/Kg | 2.94 | mg/Kg | |
| Benzo(a)pyrene | 0.0150 m | g/Kg | 2.77 | mg/Kg | |
| Benzo(b)fluoranthene | 0.0120 m | g/Kg | 2.82 | mg/Kg | |
| Benzo(g,h,i)perylene | 0.0500 m | g/Kg | 2.88 | mg/Kg | |
| Benzo(k)fluoranthene | 0.0110 m | g/Kg | 2.74 | mg/Kg | |
| Chrysene | 0.100 m | g/Kg | 2.79 | mg/Kg | |
| Dibenz(a,h)anthracene | 0.0200 m | g/Kg | 3.12 | mg/Kg | |
| Fluoranthene | 0.140 m | g/Kg | 2.84 | mg/Kg | |
| Fluorene | 0.140 mg | g/Kg | 2.61 | mg/Kg | |
| Indeno(1,2,3-cd)pyrene | 0.0300 m | g/Kg | 2.64 | mg/Kg | |
| Naphthalene | 1.20 mg | g/Kg | 2.92 | mg/Kg | |

REPORT NUMBER : D97-8568-26 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | s | | |
|----------------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Phenanthrene | 0.420 mg/Kg | 2.51 mg/Kg | |
| Pyrene | 0.180 mg/Kg | 2.57 mg/Kg | |
| p-Terphenyl (SS) | | 0.265 mg/Kg | |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-26

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 22-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : MGK PREPARED ON : 19-JUL-1997 ANALYSIS METHOD : EPA 8020 PR /1 ANALYZED BY : MKS ANALYZED ON : 19-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 1-071797A

| BTEX ANALYSIS | | | | |
|-------------------------|-----------------|-------------|------|--|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG | |
| Benzene | 0.001 mg/Kg | 0.049 mg/Kg | | |
| Ethyl benzene | 0.002 mg/Kg | 0.054 mg/Kg | | |
| Bromofluorobenzene (SS) | | 0.058 mg/Kg | | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-26

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 22-JUL-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 15-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL

ANALYZED ON: 16-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-61

| TOTAL EXTRACTABLE HYDROCARBONS | | | ··· |
|--------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Extractable Hydrocarbons | 10.0 mg/Kg | 74.2 mg/Kg | |
| Triacontane (SS) | | 7.41 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-26

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABQC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 22-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY: MGK

PREPARED ON: 19-JUL-1997

ANALYSIS METHOD: EPA 5030/8015M /1

ANALYZED BY: MKS

ANALYZED ON: 19-JUL-1997

DILUTION FACTOR: 1

METHOD FACTOR: 1

QC BATCH NO : 2-071797

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|-------------|------|
| TEST REQUESTED. | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.00 mg/Kg | 0.504 mg/Kg | J |
| Fluorobenzene (SS) | | 0.046 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-26

REPORT DATE : 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science.

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABQC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 22-JUL-1997

| TOTAL METALS | | | | |
|----------------|------|-----------------|----------|------|
| TEST REQUESTED | | DETECTION LIMIT | RESULTS | FLAG |
| Lead | · /1 | 2 mg/Kg | 11 mg/Kg | D |

Dilution Factor: 10

Prepared using EPA 3051 on 15-JUL-1997 by CEL Analyzed using EPA 7421 on 17-JUL-1997 by GGD

QC Batch No : AC160-16F

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-27

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS : 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC# : BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 22-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : CNA

PREPARED ON : 18-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : CNA

ANALYZED ON: 19-JUL-1997

DILUTION FACTOR: 1
METHOD FACTOR: 1

QC BATCH NO : 30071897AR

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|-----------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 2.0 µg/L | 54.9 μg/L | |
| Ethyl benzene | 2.0 μg/L | 57.3 μg/L | |
| Bromofluorobenzene (SS) | | 49.6 μg/L | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-28

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BD2#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 22-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : RFG

PREPARED ON: 21-JUL-1997

ANALYSIS METHOD : EPA 8020 PR /1

ANALYZED BY : MKS

ANALYZED ON: 21-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 25-072197

| BTEX ANALYSIS | | | |
|-------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Benzene | 0.001 mg/Kg | 0.047 mg/Kg | |
| Ethyl benzene | 0.002 mg/Kg | 0.054 mg/Kg | |
| Bromofluorobenzene (SS) | | 0.055 mg/Kg | |

DATE RECEIVED: 10-JUL-1997 REPORT NUMBER: D97-8568-28

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABOC#

: BD2#(0-0')

: BD2#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 22-JUL-1997
PREPARATION METHOD: EPA 5030
PREPARED BY: RFG
PREPARED ON: 21-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : MKS

ANALYZED ON : 21-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 26-072197

| TOTAL VOLATILE HYDROCARBONS | | | |
|-----------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Total Volatile Hydrocarbons | 1.00 mg/Kg | 0.586 mg/Kg | J |
| Fluorobenzene (SS) | | 0.048 mg/Kg | |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER : D97-8568-29

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS ID MARKS : LABOC#

: LB#(0-0') PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 4-AUG-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT

PREPARED ON: 28-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 30-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR: 1

QC BATCH NO : AC143-73A

| TEST REQUESTED | DETECTION | LIMIT | | RESULTS | | FLAG |
|------------------------|-----------|--------|---|---------|-------|------|
| Acenaphthene | 1.20 | mg/Kg | < | 1.20 | mg/Kg | U |
| Acenaphthylene | 1.54 | mg/Kg | < | 1.54 | mg/Kg | U |
| Anthracene | 0.440 | mg/Kg | < | 0.440 | mg/Kg | U |
| Benzo(a)anthracene | 0.0090 | mg/Kg | < | 0.0090 | mg/Kg | U |
| Benzo(a)pyrene | 0.0150 | mg/Kg | < | 0.0150 | mg/Kg | U |
| Benzo(b)fluoranthene | 0.0120 | mg/Kg | < | 0.0120 | mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0500 | mg/Kg | < | 0.0500 | mg/Kg | U |
| Benzo(k)fluoranthene | 0.0110 | mg/Kg | < | 0.0110 | mg/Kg | U |
| Chrysene | 0.100 | mg/Kg | < | 0.100 | mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0200 | mg/Kg | < | 0.0200 | mg/Kg | U |
| Fluoranthene | 0.140 | ing/Kg | < | 0.140 | mg/Kg | U |
| Fluorene | 0.140 | mg/Kg | < | 0.140 | mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0300 | mg/Kg | < | 0.0300 | mg/Kg | U |
| Naphthalene | 1.20 | mg/Kg | < | 1.20 | mg/Kg | u |

REPORT NUMBER : D97-8568-29 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-------------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT . | | RESULTS | FLAG |
| Phenanthrene | 0.420 mg/Kg | < | 0.420 mg/Kg | U |
| Pyrene | 0.180 mg/Kg | < | 0.180 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.230 mg/Kg | · |

DATE RECEIVED : 10-JUL-1997

REPORT NUMBER: D97-8568-30

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS

ID MARKS : LABQC#

: BS#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 4-AUG-1997 PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 28-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA
ANALYZED ON : 30-JUL-1997
DILUTION FACTOR : 1 METHOD FACTOR: 1

QC BATCH NO : AC143-73A

| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
|------------------------|-----------------|------------|------|
| Acenaphthene | 1.20 mg/Kg | 2.37 mg/Kg | |
| Acenaphthylene | 1.54 mg/Kg | 2.32 mg/Kg | |
| Anthracene | 0.440 mg/Kg | 2.34 mg/Kg | |
| Benzo(a)anthracene | 0.0090 mg/Kg | 3.03 mg/Kg | |
| Benzo(a)pyrene | 0.0150 mg/Kg | 2.69 mg/Kg | |
| Benzo(b)fluoranthene | 0.0120 mg/Kg | 2.91 mg/Kg | |
| Benzo(g,h,i)perylene | 0.0500 mg/Kg | 2.95 mg/Kg | |
| Benzo(k)fluoranthene | 0.0110 mg/Kg | 2.73 mg/Kg | |
| Chrysene | 0.100 mg/Kg | 2.88 mg/Kg | |
| Dibenz(a,h)anthracene | 0.0200 mg/Kg | 3.20 mg/Kg | |
| Fluoranthene | 0.140 mg/Kg | 2.92 mg/Kg | |
| Fluorene | 0.140 mg/Kg | 2.52 mg/Kg | |
| Indeno(1,2,3-cd)pyrene | 0.0300 mg/Kg | 2.72 mg/Kg | |
| Naphthalene | 1.20 mg/Kg | 2.80 mg/Kg | |

REPORT NUMBER : D97-8568-30 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | s | | |
|----------------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Phenanthrene | 0.420 mg/Kg | 2.50 mg/Kg | |
| Pyrene | 0.180 mg/Kg | 2.70 mg/Kg | |
| p-Terphenyl (SS) | | 0.282 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-31

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil/Solid Quality Control for IRPIMS ID MARKS : LABQC#

: BD#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 4-AUG-1997

PREPARATION METHOD : EPA 3550A

PREPARED BY : CLT PREPARED ON : 28-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 30-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC143-73A

| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaph thene | 1.20 mg/Kg | 2.38 mg/Kg | i. |
| Acenaphthylene | 1.54 mg/Kg | 2.30 mg/Kg | |
| Anthracene | 0.440 mg/Kg | 2.33 mg/Kg | |
| Benzo(a)anthracene | 0.0090 mg/Kg | 3.04 mg/Kg | |
| Benzo(a)pyrene | 0.0150 mg/Kg | 2.72 mg/Kg | |
| Benzo(b)fluoranthene | 0.0120 mg/Kg | 2.93 mg/Kg | |
| Benzo(g,h,i)perylene | 0.0500 mg/Kg | 2.97 mg/Kg | |
| Benzo(k)fluoranthene | 0.0110 mg/Kg | 2.74 mg/Kg | |
| Chrysene | 0.100 mg/Kg | 2.89 mg/Kg | |
| Dibenz(a,h)anthracene | 0.0200 mg/Kg | 3.22 mg/Kg | |
| Fluoranthene | 0.140 mg/Kg | 2.91 mg/Kg | |
| Fluorene | 0.140 mg/Kg | 2.49 mg/Kg | |
| Indeno(1,2,3-cd)pyrene | 0.0300 mg/Kg | 2.75 mg/Kg | |
| Naphthalene | 1.20 mg/Kg | 2.77 mg/Kg | |

REPORT NUMBER : D97-8568-31 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | s . | | |
|----------------------------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Phenanthrene | 0.42G mg/Kg | 2.47 mg/Kg | |
| Pyrene | 0.180 mg/Kg | 2.69 mg/Kg | |
| p-Terphenyl (SS) | | 0.282 mg/Kg | |

DATE RECEIVED : 10-JUL-1997 REPORT NUMBER : D97-8568-32

REPORT DATE: 5-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science

ADDRESS: 257A 28 Rd.

: Grand JCT, CO 81503

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Soil for IRPIMS

ID MARKS : GU-SB07-11#

: N2#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 4-AUG-1997

PREPARATION METHOD : EPA 3550A
PREPARED BY : CLT
PREPARED ON : 28-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1 ANALYZED BY : JXA ANALYZED ON : 31-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC143-73A

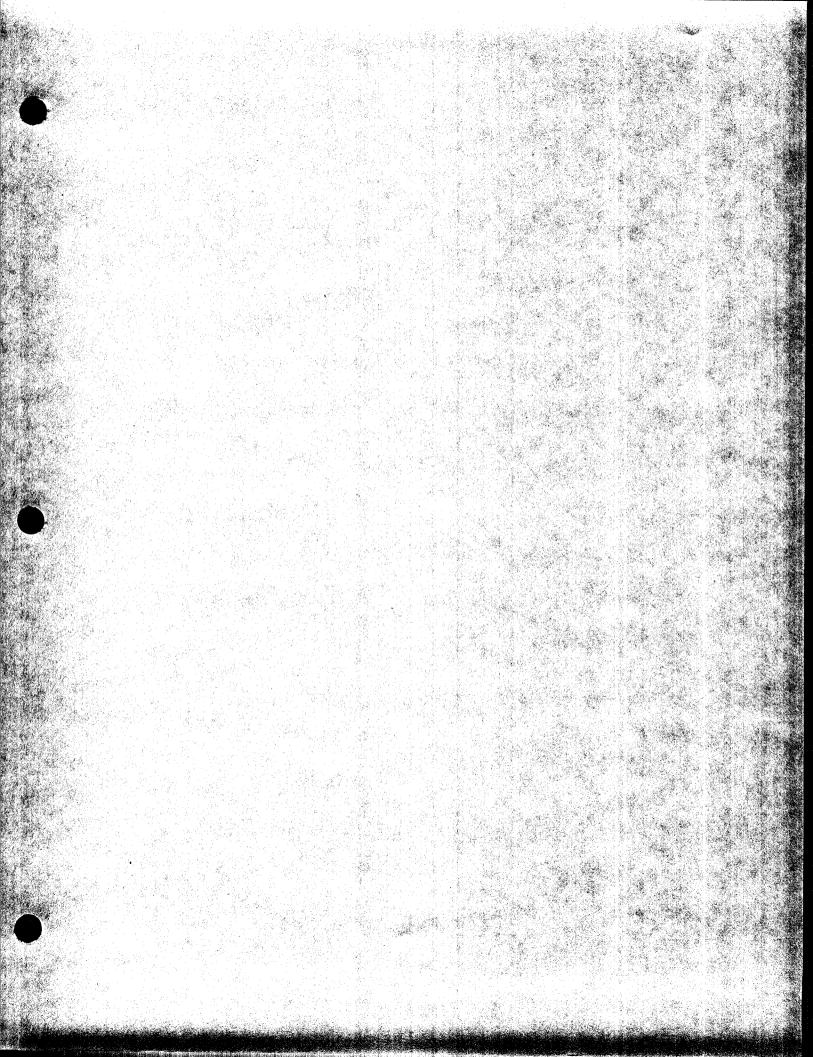
| POLYNUCLEAR AROMATIC HYDROCARBONS | | | |
|-----------------------------------|-----------------|----------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS | FLAG |
| Acenaphthene | 1.20 mg/Kg | < 1.20 mg/Kg | U |
| Acenaphthylene | 1.54 mg/Kg | < 1.54 mg/Kg | U |
| Anthracene | 0.440 mg/Kg | < 0.440 mg/Kg | U |
| Benzo(a)anthracene | 0.0090 mg/Kg | < 0.0090 mg/Kg | U |
| Benzo(a)pyrene | 0.0150 mg/Kg | < 0.0150 mg/Kg | U |
| Benzc(b)fluoranthene | 0.0120 mg/Kg | < 0.0120 mg/Kg | U |
| Benzo(g,h,i)perylene | 0.0500 mg/Kg | < 0.0500 mg/Kg | U |
| Benzo(k)fluoranthene | 0.0110 mg/Kg | < 0.0110 mg/Kg | U |
| Chrysene | 0.100 mg/Kg | < 0.100 mg/Kg | U |
| Dibenz(a,h)anthracene | 0.0200 mg/Kg | < 0.0200 mg/Kg | U |
| Fluoranthene | 0.140 mg/Kg | < 0.140 mg/Kg | U |
| Fluorene | 0.140 mg/Kg | < 0.140 mg/Kg | U |
| Indeno(1,2,3-cd)pyrene | 0.0300 mg/Kg | < 0.0300 mg/Kg | U |
| Naphthalene | 1.20 mg/Kg | < 1.20 mg/Kg | U |

REPORT NUMBER : D97-8568-32 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S | | | |
|----------------------------------|-----------------|---|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | | RESULTS | FLAG |
| Phenanthrene | 0.420 mg/Kg | < | 0.420 mg/Kg | U |
| Pyrene | 0.180 mg/Kg | < | 0.180 mg/Kg | U |
| p-Terphenyl (SS) | | | 0.216 mg/Kg | |

DESCRIPTION OF REPORTING FLAGS

- U Indicates compound was analyzed for but not detected.
- J Indicates an estimated value. This flag is used if the compound is detected but is below the Reporting Limit.
- D Indicates all compounds in an analysis at a secondary dilution.
- N Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds where the identification is based on a mass spectral library search.
- E Indicates the compounds whose concentration exceed the limit of the instrument or the Laboratory Information Management System. The concentration will be greater than the concentration listed.
- Q Indicates the surrogate recovery is outside the defined QC limits.
- M Indicates the matrix has interfered with the recovery of the surrogates.
- O Indicates the surrogate was lost because of dilution.



DATE RECEIVED: 12-JUL-1997 REPORT NUMBER: D97-8703

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science

ADDRESS: 1700 Broadway, Suite 900

Denver, CO 80290

ATTENTION : Mr. John Hall

PROJECT: 726876.24120 Gunter Annex

CASE NARRATIVE SUMMARY

This is an ITS Level 4 data package, containing results for the analysis of organic and inorganic parameters by EPA methodologies.

Sample Receipt

Sample TB04 was not received with the sample shipment. Per the client, this sample was not sent, although it is listed on the chain of custody.

EPA Method 8260 Volatile Organics Analysis

Calibrations

For the continuing calibration of instrument ITS7, the percent differences for the following compounds were outside of the QC limits of $\leq 20\%$

ITS7 7/17/97 07:23 chloromethane (39.6%)

dichlorodifluoromethane (25.6%)

bromoform (31.8%)

1,2,4-trichlorobenzene (26.4%)

hexachlorobutadiene (30.0%)

naphthalene (23.4%)

1,2,3-trichlorobenzene (468%)

2-butanone (30.0%)

4-methyl-2-pentanone (28.4%)

2-hexanone (28.4%)

ITS7 7/18/97 08:50 bromoform (39.6%)

naphthalene (268%)

1,2,3-trichlorobenzene (248%)

acetone (25.2%)

acrylonitrile (30.2%)

2-butanone (40.8%)

vinyl acetate (30.0%)

Intertek Testing Services NA Inc. 1089 East Collins Boulevard Richardson, TX 75081 Telephone (972) 238-5591 Fax (972) 238-5592

| | | | | ort | | | Invoice | | <i>_</i> _ < | | | A۱ | IALYS | SIS | B | \$/ | | / | / | | | | | / / | 7 1 | ib us | ′ |
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CHAIN OF COSTODI RECORD

115 Environmental Laboratories 1089 East Collins Blvd., #100 Richardson, 1X 73081 (972) 238-3391

CHAIN OF CUSTODY RECORD

V

ITS Environmental Laboratories 1089 East Collins Blvd., #100 Richardson, TX 75081 (972) 238-5591

| S Environmental Laboratories 1089 East | Collins Blvd., #100 Richard | dson, TX 75081 (9 | 912) 238-3391 | | CHAIN OF CUSTODY RECOF |
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| Report to: | Invoice | | ANALYSIS | 111 | / / / / Lab ul |
| Company: Parsous ES | Company: Parsons | ES | - REQUESTE | 数 / / / | Due Date: |
| Address: 257A 28 Rd | Address: 1700 B | proadway | _ | <u>م</u> ار / / الم | |
| Grand Jet., Co 81503 | Denver, | CO 80240 | _ | 4 / / L | Temp. of coolers when received (C°): |
| Contact: John Hall | Contact: John | | - \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ \ | / / / [6] | |
| Phone: (970) 244-8829 | Phone $(3a3) &$ | 31 8100 | 10H
1015M | 10 80 80 80 80 80 80 80 80 80 80 80 80 80 | S//// Custody Seal N/ |
| Fax: | PO/SO #: 72687 | 6.24120 | _ | | O I I I I I I I I I I I I I I I I I I I |
| | | | _ | 10/2/20 | Screened |
| ampler's Name John Hall | Sampler's Signature | | 25 GC (2) (2) (2) (3) (4) (4) (4) (4) (4) (4) (4) (4) (4) (4 | 12 / 1/2/ 2/
12 / 1/2/ 2/ | For Radioactivity |
| roj No. 76, Project Name 4,20, Gunter Annex | Option 2 | No./Type of Container | | \$ 2 E 2 | |
| nix Date Time C G r Identifying Marks of | | VOA A/G 250 F | 100 000 000 000 000 000 000 000 000 000 | 3 7 2 | Lab Sample ID (Lab Use Only) |
| | ^ | | | , 1, 1, 1 | |
| 17/142 1140 X GU-GMW | 3 | | 3 1 1 | 1 1 2 | |
| 17/10/12 1030 X GU-GMW 17/11/12/1040 Tprip Blank | 9 | 6 4 | 3 1 1 | 113 | <u> </u> |
| 17/11/19 1040 Tong Blank | P TB-03 | | | | 1 |
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| n around time Priority 1 or Standard ☐ Priority 2 | or 50% Priority 2-or 100% L. | Priority 4 ERS * | • BTEX (602/ | 8020), TPH (418.1 or 801 | 5), VOLATILES (624/8240), IGNITABILITY, TOTAL LEAD (6010) |
| Induished by: (Signature) Date: | Time: Received by: (Signature) | | ate: Time: | Remarks | |
| | Time: Received by: (Signal | May 5 | 7/2/97 097
ate: Time: | 4 | |
| elinquished by: (Signature) Date: | rano. Neceived by, (Signa | | afte: / Time: | | |
| elinquished by: (Signature) Date: | Time: Received by: (Signa | ture) D | ate: Time: | | amples constitutes acceptance of Inchcape/ITS-Dallas terms ained in the Price Schedule. |
| atrix WW - Wastewater W - Water ontainer VOA - 40 ml vial A/G - Amber / | S - Soil SD - Solid L - Liquid
Or Glass 1 Liter 250 ml - Gl | A - Air Bag
tass wide mouth | C - Charcoal tube
P/O - Plastic or other | | Please Fax written changes to 972-238-5592 |

| | COOLER RECEIPT FORM | _ | | |
|-------|---|-------|------|------|
| | _/ 1 | G-V | nter | Anne |
| Date | Received: 7/2/97 Project: 7/68 | 76-24 | 1120 | |
| Date | Logged-in: 7/2/97 Received by: | me Ti | ncy | |
| No. o | f coolers received: 3 Cooler Numbers: 7 | A | | |
| 1 | Shipping slip. If yes, carrier and bill number: FED FA 4(1) (8 796 | Yes | No | |
| 2 | Custody seals on cooler. If yes, how many and where: | Yes | No | |
| 3 | Custody seals intact. | Yes | No | |
| 4 | Chain of Custody in plastic. | Yes | No | |
| 5 | Chain of Custody filled out properly. | Yes | No | |
| 6 | Client signed Chain of Custody. | Yes | No | |
| 7 | Samples shipped on ice. If no, temperature of cooler: | Yes | No | 20m |
| 8 | All bottles sealed. | Yes | No | JOM |
| 9 | All bottles received intact. | Yes | No | |
| 10 | Labels in good condition and complete. | Yes | No | |
| 11 | Sample labels agree with Chain of Custody. | (Yes) | No | |
| 12 | Correct containers used. | | No | |
| 13 | Correct preservative used. | Yes | No | |
| 14 | Sufficient sample provided. | (Yes) | No | |
| 15 | Bubbles absent from VOA. | (Yes) | No | |
| 16 | Comments (use corrective action form if necessary): | | | |
| | | | | |
| | | | | |
| | | | | · |
| ļ | | | | |

<sup>\*\*</sup> If client or project manager need to be notify for any reason, please use the Case Narrative/Corrective Action green form.

SAMPLE PRESERVATION INFORMATION SHEET

| reserved By | XRH | JOB NUMBER |
|-------------|----------|---------------------|
| Date | 7-15-971 | 87103 |
| Time | | Client Name Parsons |
| | | ,) (+) |

| | Container | Apparent | loisiet et te | | | | |
|-------------------------------|-------------|--------------|---------------------------|--|-----------------------|----------------------------|--|
| Sample No. | Туре | Volume (mLs) | Initial pH*
(20± 2° C) | Final pH | Preservative
Added | Filtration | Comments |
| 87103-1 | AG | 1 | 5,5 | 5,5 | 4 | | NP |
| -2 | 1 % | \ | 6.0 | 6,0 | } | | |
| -3 | | | | 1 | | | |
| -4 | | | 5,71 | 5.7 | | | |
| -M | | | <i>5</i> 5 | 5.5 | | | |
| -8 | | | 5.6 | 5,6 | | | |
| | | | • | | | | |
| | | | | | | | |
| | | | | | | | includes IPIC |
| | | | | | | | for sulfate |
| | | | - | | | | on #51,2,3,4,7+8 |
| | | | | | | | IAGILTPH (HCL) |
| | | | | | | | 00#1,2,3,4,7148 |
| | - | | | | | | 1PIL formetals |
| | | | | | | | Dn # 1,2,3,4,7+8 |
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| | | | | | | · | |
| | .] | | · | | | | |
| pH Duplicate (maximum dif | ference = 0 | 3). | | PRESERVATION | N / FILTPATIO | N KEV | · / |
| 050 | | د). | 5,5 | 1 = Pre-preserve
2 = H <sub>2</sub> SO <sub>4</sub> to ph | ed | 5 = Na(| OH to pH>12 |
| | <u></u> | | | $3 = HNO_3$ to pH | <2 . | - | S <sub>2</sub> O <sub>3</sub> (0.008%)
L Zn OAc/NaOH to pH>12 |
| pH LCS (ph = 7.0 ± 0.2): | | | £7 | 4 = HCl to pH<2 | | | Preservative Required |
| Number: 10 | 0 | | 7.0 | L = Sample filter | ed (0.45 pm) in | sample was
the laborate | filtered in the field
ory before preservation |

<sup>\*</sup> The initial pH balance is determined in accordance with EPA methods 150.1 / SW-846 9040 using a sample of aliquot which has been adjusted to 20 ± 2°C

| | Feo Exa USA Airbill , Macking 4611683996 | FedEx Retrieval Copy + |
|----------|---|--|
| + | From 7/11/97 Sender's FedEx Account Number 1674-0246-1 | Express Package Service Packages under 150 lbs. Fedfex Priority Overnight 5 Fedfex Standard Overnight 3 Fedfex 2Day' |
| C | Sources Talan Hall Phone 58378318100 | 6 NEW FodEx First Overhight (Exposes continuous sections of a continuous section of a continuous section of the first own of the first section of the first |
| | Name Pursous ES Sait 900 Address 1700 Broadway | Express Freight Service Packages over 150 lbs. PedEx Overright Freight FedEx Overright Freight Special bloomers day Special bloom |
| | Denver State (0 710 80290 | Packaging 6 Fedfx 7 Fedfx 3 Fedfx 4 Fedfx 1 Other Prg. |
| <u></u> | 2 Your Internal Billing Reference Information 726876.24128 | Does this shipment contain dangerous goods? 4 Yes to the Control of Control o |
| | Recepents T, MCKittrick Phone (412) 238 \$591 | than prove Grands Ship parts there is a construction of the first and appropriate the first and |
| | Gorpany ITS Environmental Lab #100 Address 1089 E. Collins Blud | to: Account to in section 1 Add to be briefly |
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| | For HOLD at FedEx Location check here Hold Weekday 2 Hold Saturday (Not available at all locations) Hold Weekday 2 Hold Saturday (Not available at all locations) Hold Saturday (Not available to all locations) Hold Saturday (Not available to all locations) Hold Saturday (Not available to all locations) Hold Saturday (Not available to all locations) For For Saturday Delivery check here Prof. Saturday Delivery check here Saturday Delivery check here Saturday Delivery check here Saturday Delivery check here Hold Weekday 2 Hold Saturday (Not available to all locations) Hold Saturday Delivery check here Hold Weekday 2 Hold Saturday (Not available to all locations) Hold Saturday Delivery check here Saturday Delivery check here Saturday Delivery check here Hold Weekday 2 Hold Saturday (Not available to all locations) Hold Saturday | COMMITTIONS DECLARED VALUE AND LIMIT OF LABILITY For two Loc Cardin confirmations COMMITTIONS DECLARED VALUE AND LIMIT OF LABILITY For two Loc Cardin confirmations CITE OF CARD VALUE AND LIMIT OF LABILITY For two Loc Cardin confirmations CITE OF CARD VALUE AND LIMIT OF LABILITY For two Loc Cardin confirmations |
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ANALYTICAL REPORT

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

PROJECT: 726876.24120 Gunter Annex

Included in this data package are the analytical results for the sample group which you have submitted to Intertek Testing Services for analysis. These results are representative of the samples as received by the laboratory.

The information contained herein has undergone extensive review and is deemed accurate and complete. Sample analysis and quality control were performed in accordance with all applicable protocols. Please refrain from reproducing this report except in its entirety.

If you have any questions regarding this report and its associated materials please call your Project Manager at (214) 238-5591.

We appreciate the opportunity to serve you and look forward to providing continued service in the future.

> Martin Jef General Manager

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-1 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW1#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 9-JUL-1997
PREPARATION METHOD: EPA 5030
PREPARED BY: MGD
PREPARED ON: 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS | | | | | | |
|----------------------|-----------|-------|-----|--------|------|------|
| TEST REQUESTED | DETECTION | LIMIT | | RESULT | S | FLAG |
| Acetone | 20.0 | μg/L | < | 20.0 | μg/L | U |
| Acrylonitrile | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Benzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Bromobenzene | 5.00 | μg/L | < | 5.00 | μg/L | υ |
| Bromochloromethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Bromodichloromethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Bromoform | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Carbon disulfide | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Carbon tetrachloride | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Chlorobenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Chloroethane | 5.00 | μg/L | . < | 5.00 | μg/L | υ |
| Chloroform | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 2-Chlorotoluene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 4-Chlorotoluene | 5.00 | μg/L | < | 5.00 | μg/L | U |

Intertek Testing Services NA Inc. 1089 East Collins Boulevard Richardson, TX 75081 Telephone (972) 238-5591 Fax (972) 238-5592

REPORT NUMBER : D97-8703-1 ANALYSIS METHOD : EPA 8260 /1

PAGE 2

| TEST REQUESTED | DETECTION | LIMIT | | RESULT | S | FLAG |
|-----------------------------|-----------|-------|---|--------|------|------|
| 2-Chloroethylvinyl ether | 10.0 | μg/L | < | 10.0 | μg/L | U |
| Dibromochloromethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,2-Dibromo-3-chloropropane | 25.0 | μg/L | < | 25.0 | μg/L | U |
| 1,2-Dibromoethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,2-Dichlorobenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,3-Dichlorobenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,4-Dichlorobenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| trans-1,4-Dichloro-2-butene | 100 | μg/L | < | 100 | μg/L | U |
| 1,1-Dichloroethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,2-Dichloroethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,1-Dichloroethene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| cis-1,2-Dichloroethene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| trans-1,2-Dichloroethene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,2-Dichloropropane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 2,2-Dichloropropane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,1-Dichloropropene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,3-Dichloropropane | 5.00 | μg/L | < | 5.00 | μg/L | υ |
| cis-1,3-Dichloropropene | 5.00 | μg/L | < | 5.00 | μg/L | υ |
| trans-1,3-Dichloropropene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Ethylbenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 2-Hexanone | 50.0 | μg/L | < | 50.0 | μg/L | U |
| Bromomethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Chloromethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Dibromomethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 2-Butanone | 100 | μg/L | < | 100 | μg/L | U |
| Iodomethane | 5.00 | μg/L | < | 5.00 | μg/L | U |

REPORT NUMBER : D97-8703-1 ANALYSIS METHOD : EPA 8260 /1

PAGE 3

| TEST REQUESTED | DETECTION | LIMIT | | RESULT | S | FLAC |
|----------------------------|-----------|---------------------------------------|------------|--------|------|------|
| Methylene chloride | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 4-Methyl-2-pentanone | 100 | μg/L | < | 100 | μg/L | U |
| Styrene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,1,1,2-Tetrachloroethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,1,2,2-Tetrachloroethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Tetrachloroethene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Toluene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,2,3-Trichlorobenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,2,4-Trichlorobenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,1,1-Trichloroethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,1,2-Trichloroethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Trichloroethene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Trichlorofluoromethane | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,2,3-Trichloropropane | 5.00 | μg/L | < | 5.00 | μg/L | υ |
| 1,3,5-Trimethylbenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| 1,2,4-Trimethylbenzene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Vinyl acetate | 50.0 | μg/L | < | 50.0 | μg/L | U |
| Vinyl chloride | 2.00 | μg/L | < | 2.00 | μg/L | U |
| m,p-Xylene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| o-Xylene | 5.00 | μg/L | < | 5.00 | μg/L | U |
| Toluene-d8 (SS) | | | | 50.1 | μg/L | |
| Bromofluorobenzene (SS) | | · · · · · · · · · · · · · · · · · · · | | 57.0 | μg/L | |
| 1,2-Dichloroethane-d4 (SS) | | | _ <u> </u> | 51.5 | μg/L | |
| Dibromofluoromethane (SS) | | | | 54.5 | μg/L | |

Intertek Testing Services NA Inc. 1089 East Collins Boulevard Richardson, TX 75081 Telephone (972) 238-5591 Fax (972) 238-5592

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DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-1

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW1#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 9-JUL-1997

ANALYZED BY : MGD

ANALYZED ON: 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR: 1

OC BATCH NO : 9707177001

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |         |      |  |  |  |  |  |
|----------------------------------|----------------|----------|---------|------|--|--|--|--|--|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT  | FLAG |  |  |  |  |  |
| No compounds detected above      |                | VOA      | 10 ug/L | N    |  |  |  |  |  |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-1 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW1# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997

PREPARATION METHOD : EPA 3520B

PREPARED BY : TAP

PREPARED ON: 16-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 24-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-74

| POLYNUCLEAR AROMATIC HYDROCARBONS |           |       |   |         |      |      |
|-----------------------------------|-----------|-------|---|---------|------|------|
| TEST REQUESTED                    | DETECTION | LIMIT |   | RESULTS |      | FLAG |
| Acenaphthene                      | 18.0      | μg/L  | < | 18.0    | μg/L | U    |
| Acenaphthylene                    | 23.0      | μg/L  | < | 23.0    | μg/L | U    |
| Anthracene                        | 6.60      | μg/L  | < | 6.60    | μg/L | U    |
| Benzo(a)anthracene                | 0.130     | μg/L  | < | 0.130   | μg/L | U    |
| Benzo(a)pyrene                    | 0.120     | μg/L  | < | 0.120   | μg/L | U    |
| Benzo(b)fluoranthene              | 0.180     | μg/L  | < | 0.180   | μg/L | U    |
| Benzo(g,h,i)perylene              | 0.760     | μg/L  | < | 0.760   | μg/L | U    |
| Benzo(k)fluoranthene              | 0.170     | μg/L  | < | 0.170   | μg/L | U    |
| Chrysene                          | 1.50      | μg/L  | < | 1.50    | μg/L | U    |
| Dibenz(a,h)anthracene             | 0.300     | μg/L  | < | 0.300   | μg/L | U    |
| Fluoranthene                      | 2.10      | μg/L  | < | 2.10    | μg/L | υ    |
| Fluorene                          | 2.10      | μg/L  | < | 2.10    | μg/L | U    |
| Indeno(1,2,3-cd)pyrene            | 0.430     | μg/L  | < | 0.430   | μg/L | U    |
| Naphthalene                       | 18.0      | μg/L  | < | 18.0    | μg/L | U    |

REPORT NUMBER : D97-8703-1 ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S               |             | •    |
|----------------------------------|-----------------|-------------|------|
| TEST REQUESTED                   | DETECTION LIMIT | RESULTS     | FLAG |
| Phenanthrene                     | 6.40 μg/L       | < 6.40 μg/L | U    |
| Pyrene                           | 2.70 μg/L       | < 2.70 μg/L | U    |
| p-Terphenyl (SS)                 |                 | 8.34 µg/L   |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-1

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc ADDRESS : 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW1# : N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997 PREPARATION METHOD : EPA 3510B

PREPARED BY : KDF

PREPARED ON: 16-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                 |           |      |
|--------------------------------|-----------------|-----------|------|
| TEST REQUESTED                 | DETECTION LIMIT | RESULTS   | FLAG |
| Total Extractable Hydrocarbons | 1000 μg/L       | 53.0 μg/L | J    |
| Triacontane (SS)               |                 | 214 49/-  |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-1 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW1#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 9-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : LLB PREPARED ON : 16-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT ANALYZED ON : 20-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 29072097RB

| TOTAL VOLATILE HYDROCARBONS |         |                     |         |      |        |      |
|-----------------------------|---------|---------------------|---------|------|--------|------|
| TEST REQUESTED              | DETECTI | ON LIMIT            | RESULTS |      |        | FLAG |
| Total Volatile Hydrocarbons | 100     | μg/L                | <       | 100  | μg/L   | U    |
| Flucrobenzene (SS)          |         | · · · · · · · · · · |         | 48.6 | - μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-1

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS ID MARKS : GU-GMW1#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 9-JUL-1997

| TOTAL METALS   |    |                 |             |      |
|----------------|----|-----------------|-------------|------|
| TEST REQUESTED |    | DETECTION LIMIT | RESULTS     | FLAG |
| Lead           | /1 | 0.0020 mg/L     | 0.0017 mg/L | J    |

Dilution Factor: 1

Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD

QC Batch No : AC160-35F

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-1

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW1#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 9-JUL-1997

| MISCELLANEOUS ANALYSES |    |                 |           |      |
|------------------------|----|-----------------|-----------|------|
| TEST REQUESTED         |    | DETECTION LIMIT | RESULTS   | FLAG |
| Sulfate                | /1 | 1.00 mg/L       | 0.76 mg/L | ρ'n  |

Dilution Factor: 5

Analyzed using EPA 9056 on 21-JUL-1997 by LKD

QC Batch No : 32-0721971

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-2 REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW2#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGD

PREPARED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    |           |        |   |             |      |
|----------------------|-----------|--------|---|-------------|------|
| TEST REQUESTED       | DETECTION | LIMIT  |   | RESULTS     | FLAC |
| Acetone              | 20.0      | μg/L   | < | 20.0 μg/L   | U    |
| Acrylonitrile:       | 5.00      | μg/L - | < | 5.00 · μg/L | ່ນ   |
| Benzene              | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| Bromobenzene         | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| Bromochloromethane   | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| Bromodichloromethane | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| Bromoform            | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| Carbon disulfide     | 5.00      | μg/L   | < | 5.00 µg/L   | U    |
| Carbon tetrachloride | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| Chlorobenzene        | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| Chloroethane         | 5.00      | μg/L   | < | 5.00 µg/L   | IJ   |
| Chloroform           | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| 2-Chlorotoluene      | 5.00      | μg/L   | < | 5.00 μg/L   | U    |
| 4-Chlorotoluene      | 5.00      | μg/L   | < | 5.00 µg/L   | U    |

REPORT NUMBER : D97-8703-2 ANALYSIS METHOD : EPA 8260 /1 PAGE 2 ·

| VOLATILE ORGANICS           |           |       |   | <del></del> | - 1 1 |      |
|-----------------------------|-----------|-------|---|-------------|-------|------|
| TEST REQUESTED              | DETECTION | LIMIT |   | RESULTS     | S     | FLAG |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | < | 10.0        | μg/L  | U    |
| Dibromochloromethane        | 5.00      | μg/L  | < | 5.00        | μg/L  | υ    |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | < | 25.0        | μg/L  | U    |
| 1,2-Dibromoethane           | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | < | 100         | μg/L  | U    |
| 1,1-Dichloroethane          | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 1,2-Dichloroethane          | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 1,1-Dichloroethene          | 5.00      | μg/L  | < | 5.00        | μg/L  | υ    |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | < | 5.00        | μg/L  | υ    |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 1,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 2,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 1,1-Dichloropropene         | 5.00      | μg/L  | < | 5.00        | μg/L  | u    |
| 1,3-Dichloropropane         | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| Ethylbenzene                | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 2-Hexanone                  | 50.0      | μg/L  | < | 50.0        | μg/L  | U    |
| Bromomethane                | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| Chloromethane               | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| Dibromomethane .            | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |
| 2-Butanone                  | 100       | μg/L  | < | 100         | μg/L  | U    |
| Iodomethane                 | 5.00      | μg/L  | < | 5.00        | μg/L  | U    |

REPORT NUMBER : D97-8703-2 ANALYSIS METHOD : EPA 8260 /1

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| TEST REQUESTED             | DETECTION LIMIT | RESULTS     | FLAG |
|----------------------------|-----------------|-------------|------|
| Methylene chloride         | 5.00 μg/L       | < 5.00 μg/L | U    |
| 4-Methyl-2-pentanone       | 100 µg/L        | < 100 μg/L  | U    |
| Styrene                    | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,1,1,2-Tetrachloroethane  | 5.00 μg/L       | < 5.00 μg/L | u    |
| 1,1,2,2-Tetrachloroethane  | 5.00 µg/L       | < 5.00 μg/L | U    |
| Tetrachloroethene          | 5.00 μg/L       | < 5.00 μg/L | U    |
| Toluene                    | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,3-Trichlorobenzene     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,4-Trichlorobenzene     | 5.00 µg/L       | < 5.00 μg/L | U    |
| 1,1,1-Trichloroethane      | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,1,2-Trichloroethane      | 5.00 μg/L       | < 5.00 μg/L | U    |
| Trichloroethene            | 5.00 μg/L       | < 5.00 μg/L | U    |
| Trichlorofluoromethane     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,3-Trichloropropane     | 5.00 дg/L       | < 5.00 μg/L | υ    |
| 1,3,5-Trimethylbenzene     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,4-Trimethylbenzene     | 5.00 μg/L       | < 5.00 μg/L | U    |
| Vinyl acetate              | 50.0 μg/L       | < 50.0 μg/L | U    |
| Vinyl chloride             | 2.00 μg/L       | < 2.00 μg/L | U    |
| m,p-Xylene                 | 5.00 μg/L       | < 5.00 μg/L | U    |
| o-Xylene                   | 5.00 μg/L       | < 5.00 μg/L | U    |
| Toluene-d8 (SS)            |                 | 49.9 µg/L   |      |
| Bromofluorobenzene (SS)    |                 | 59.7 μg/L   |      |
| 1,2-Dichloroethane-d4 (SS) |                 | 51.0 µg/L   | _    |
| Dibromofluoromethane (SS)  |                 | 50.8 μg/L   |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-2 · REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc ADDRESS : 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW2#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR : 1

QC BATCH NO : 9707177001

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |         |      |
|----------------------------------|----------------|----------|---------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT  | FLAG |
| No compounds detected above      |                | VOA      | 10 ug/L | N    |

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: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW2#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 9-JUL-1997

PREPARATION METHOD : EPA 3520B

PREPARED BY : TAP PREPARED ON : 16-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 25-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-74

| POLYNUCLEAR AROMATIC HYDROCARBONS |                  |                    |      |
|-----------------------------------|------------------|--------------------|------|
| TEST REQUESTED                    | DETECTION LIMIT  | RESULTS            | FLAG |
| Acenaph thene                     | 18.0 μg/L        | < 18.0 μg/L        | U    |
| Acenaph thy lone servers and      | 23.3···· μg/L··· | < 23.0 ··· μg/L··· | U    |
| Anthracene                        | 6.60 µg/L        | < 6.60 μg/L        | U    |
| Benzo(a)anthracene                | 0.130 μg/L       | < 0.130 μg/L       | U    |
| Benzo(a)pyrene                    | 0.120 μg/L       | < 0.120 μg/L       | U    |
| Benzo(b)fluoranthene              | 0.180 μg/L       | < 0.180 μg/L       | U    |
| Benzo(g,h,i)perylene              | 0.760 μg/L       | < 0.760 μg/L       | U    |
| Benzo(k)fluoranthene              | 0.170 μg/L       | < 0.170 μg/L       | U    |
| Chrysene                          | 1.50 µg/L        | < 1.50 μg/L        | U    |
| Dibenz(a,h)anthracene             | ύ.300 μg/L       | < 0.300 μg/L       | U    |
| Fluoranthene                      | . 2.10 μg/L      | < 2.10 μg/L        | U    |
| Fluorene                          | 2.10 µg/L        | < 2.10 μg/L        | U    |
| Indeno(1,2,3-cd)pyrene            | 0.430 μg/L       | < 0.430 µg/L       | U    |
| Naphthalene                       | 18.0 µg/L        | < 18.0 μg/L        | U    |

REPORT NUMBER : D97-8703-2 ANALYSIS METHOD : EPA 8310 PR /1 PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S               |   |           |      |
|----------------------------------|-----------------|---|-----------|------|
| TEST REQUESTED                   | DETECTION LIMIT |   | RESULTS   | FLAG |
| Phenanthrene                     | 6.40 µg/L       | < | 6.40 μg/L | U    |
| Pyrene                           | 2.70 µg/L       | < | 2.70 μg/L | U    |
| p-Terphenyl (SS)                 |                 |   | 8.23 µg/L |      |

DATE RECEIVED : ·12-JUL-1997

REPORT NUMBER : D97-8703-2 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW2#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997

PREPARATION METHOD : EPA 3510B PREPARED BY : KDF PREPARED ON : 16-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR: 1

QC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                | ·  |        |      |      |
|--------------------------------|----------------|----|--------|------|------|
| TEST REQUESTED                 | DETECTION LIMI | IT | RESUL  | TS   | FLAG |
| Total Extractable Hydrocarbons | 1000 μg/L      | L  | < 1000 | μg/L | U    |
| Triacontane -(SS) - ···        |                |    | 227    | μ9/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-2 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS ID MARKS : GU-GMW2#

: N1#(0-0')

PROJECT : 726876.24120 Gunter Annex DATE SAMPLED : 9-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : LLB PREPARED ON : 16-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT ANALYZED ON : 20-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 29072097RB

| TOTAL VOLATILE HYDROCARBONS | •               |            |      |
|-----------------------------|-----------------|------------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS    | FLAG |
| Total Volatile Hydrocarbons | 100 μg/L        | < 100 μg/L | U    |
| Flucrobenzene (SS)          |                 | 49.1 μg/L  |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-2

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW2#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 9-JUL-1997

| TOTAL METALS   |    |                 |               |      |
|----------------|----|-----------------|---------------|------|
| TEST REQUESTED |    | DETECTION LIMIT | RESULTS       | FLAG |
| Lead           | /1 | 0.0020 mg/L     | < 0.0020 mg/L | U    |

Dilution Factor: 1

Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD

QC Batch No : AC160-35F

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-2

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW2#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997

| MISCELLANEOUS ANALYSES |    |                 |           |      |
|------------------------|----|-----------------|-----------|------|
| TEST REQUESTED         |    | DETECTION LIMIT | RESULTS   | FLAG |
| Sulfate                | /1 | 0.20 mg/L       | 0.75 mg/L |      |

Dilution Factor: 1

Analyzed using EPA 9056 on 21-JUL-1997 by LKD

QC Batch No : 32-0721971

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-3 REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW44#

: N1#(0-0')

PROJECT : 726876.24120 Gunter Annex DATE SAMPLED : 10-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGD PREPARED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    | •                  |                 |      |
|----------------------|--------------------|-----------------|------|
| TEST REQUESTED       | DETECTION LIMIT    | RESULTS         | FLAG |
| Acetone              | 20.0 μg/L          | < 20.0 µg/L     | U    |
| Acrylonitrile        | 5.30··· μg/L······ | < 5.00~·μ9/1··· | υ    |
| Benzene              | 5.00 μg/L          | 7.44 μg/L       |      |
| Bromobenzene         | 5.00 μg/L          | < 5.00 μg/L     | U    |
| Bromochloromethane   | 5.00 μg/L          | < 5.00 μg/L     | U    |
| Bromodichloromethane | 5.00 μg/L          | < 5.00 μg/L     | U    |
| Bromoform            | 5.00 μg/L          | < 5.00 μg/L     | U    |
| Carbon disulfide     | 5.00 μg/L          | < 5.00 μg/L     | U    |
| Carbon tetrachloride | 5.00 μg/L          | < 5.00 μg/L     | U    |
| Chlorobenzene        | 5.00 μg/L          | < 5.00 μg/L     | U    |
| Chloroethane         | 5.00 μg/L          | < 5.00 μg/L     | U    |
| Chloroform           | 5.00 μg/L          | < 5.00 μg/L     | U    |
| 2-Chlorotoluene      | 5.00 μg/L          | < 5.00 μg/L     | U    |
| 4-Chlorotoluene      | 5.00 μg/L          | < 5.00 μg/L     | υ    |

REPORT NUMBER : D97-8703-3 ANALYSIS METHOD : EPA 8260 /1 PAGE 2

| VOLATILE ORGANICS           |           |       |   |        |      |      |
|-----------------------------|-----------|-------|---|--------|------|------|
| TEST REQUESTED              | DETECTION | LIMIT |   | RESULT | s    | FLAG |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | < | 10.0   | μg/L | υ    |
| Dibromochloromethane        | 5.00      | μg/L  | < | 5.00   | μg/L | υ    |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | < | 25.0   | μg/L | U    |
| 1,2-Dibromoethane           | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | < | 100    | μg/L | U    |
| 1,1-Dichloroethane          | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2-Dichloroethane          | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1-Dichloroethene          | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | < | 5.00   | μg/L | υ    |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 2,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | υ    |
| 1,1-Dichloropropene         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,3-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Ethylbenzene                | 5.00      | μg/L  |   | 251    | μg/L |      |
| 2-Hexanone                  | 50.0      | μg/L  | < | 50.0   | μg/L | υ    |
| Bromomethane                | 5.00      | μg/L  | < | 5.00   | μg/L | υ    |
| Chloromethane               | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Dibromomethane ·            | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 2-Butanone                  | 100       | μg/L  | < | 100    | μg/L | U    |
| Iodomethane                 | 5.00      | μg/L  | < | 5.00   | μg/L | U    |

REPORT NUMBER : D97-8703-3 ANALYSIS METHOD : EPA 8260 /1 PAGE 3

| TEST REQUESTED             | DETECTION | LIMIT |   | RESULT | s    | FLAG |
|----------------------------|-----------|-------|---|--------|------|------|
| Methylene chloride         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 4-Methyl-2-pentanone       | 100       | μg/L  | < | 100    | μg/L | U    |
| Styrene                    | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1,1,2-Tetrachloroethane  | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1,2,2-Tetrachloroethane  | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Tetrachloroethene          | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Toluene                    | 5.00      | μg/L  |   | 68.8   | μg/L |      |
| 1,2,3-Trichlorobenzene     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2,4-Trichlorobenzene     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1,1-Trichloroethane      | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1,2-Trichloroethane      | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Trichloroethene            | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Trichlorofluoromethane     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2,3-Trichloropropane     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,3,5-Trimethylbenzene     | 5.00      | μg/L  |   | 120    | μg/L |      |
| 1,2,4-Trimethylbenzene     | 5.00      | μg/L  |   | 328    | μg/L |      |
| Vinyl acetate              | 50.0      | μg/L  | < | 50.0   | μg/L | U    |
| Vinyl chloride             | 2.00      | μg/L  | < | 2.00   | μg/L | U    |
| m,p-Xylene                 | 5.00      | μg/L  |   | 560    | μg/L |      |
| o-Xylene                   | 5.00      | μg/L  |   | 279    | μg/L |      |
| Toluene-d8 (SS)            |           |       |   | 48.6   | μg/L |      |
| Bromofluorobenzene (SS)    |           |       |   | 54.8   | μg/L |      |
| 1,2-Dichloroethane-d4 (SS) |           |       |   | 49.6   | μg/L |      |
| Dibromofluoromethane (SS)  |           |       | - | 51.2   | μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-3 REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW44#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR: 1

QC BATCH NO : 9707177001

| COMPOUND               | RETENTION TIME | FRACTION | RESULT   | FLAG |
|------------------------|----------------|----------|----------|------|
| Methylbutane           | 2.09           | VOA      | 61 ug/L  | N    |
| Pentane                | 2.37           | VOA      | 29 ug/L  | N    |
| Methylpentane          | 3.89           | VOA      | 33 ug/L  | N    |
| Hexane                 | 4.35           | VOA      | 11 ug/L  | н    |
| Methylcyclopentane     | 5.25           | VOA      | 91 ug/L  | N·   |
| Methylcyclohexane      | 7.65           | VOA      | 26 ug/L  | N    |
| Ethylmethylbenzene     | 12.48          | VOA      | 170 ug/L | N    |
| Ethyldimethylbenzene   | 13.76          | VOA      | 38 ug/L  | N    |
| Ethyldimethylbenzene   | 13.86          | VOA      | 54 ug/L  | N    |
| Dihydromethylindene    | 13.99          | VOA      | 38 ug/L  | N    |
| Methylisopropylbenzene | 14.36          | VOA      | 51 ug/L  | N    |
| Dihydromethylindene    | 14.66          | VOA      | 27 ug/L  | N    |
| Dihydromethylindene    | 14.84          | VOA      | 64 ug/L  | N    |
| Naphthalene            | 15.52          | VOA      | 124 ug/L | N    |

DATE RECEIVED : 12-JUL-1997

REPORT · NUMBER : D97-8703-3 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS ID MARKS : GU-GMW44#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD : EPA 3520B

PREPARED BY : TAP

PREPARED ON: 16-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 25-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-74

| POLYNUCLEAR AROMATIC HYDROCARBONS |           |                 |   |         |        |   |
|-----------------------------------|-----------|-----------------|---|---------|--------|---|
| TEST REQUESTED                    | DETECTION | DETECTION LIMIT |   | RESULTS |        |   |
| Acenaphthene                      | 18.0      | μg/L            | < | 18.0    | μg/L   | U |
| Acenaphthylene                    | 23.0      | μg/L            |   | 0.0     | μg/L · | J |
| Anthracene                        | 6.60      | μg/L            | < | 6.60    | μg/L   | U |
| Benzo(a)anthracene                | 0.130     | μg/L            | < | 0.130   | μg/L   | U |
| Benzo(a)pyrene                    | 0.120     | μg/L            | < | 0.120   | μg/L   | U |
| Benzo(b)fluoranthene              | 0.180     | μg/L            | < | 0.180   | μg/L   | U |
| Benzo(g,h,i)perylene              | 0.760     | μg/L            | < | 0.760   | μg/L   | U |
| Benzo(k)fluoranthene              | 0.170     | μg/L            | < | 0.170   | μg/L   | U |
| Chrysene                          | 1.50      | μg/L            | < | 1.50    | μg/L   | U |
| Dibenz(a,h)anthracene             | 0.300     | μg/L            | < | 0.300   | μg/L   | υ |
| Fluoranthene                      | 2.10      | <b>π</b> 9/Γ    | < | 2.10    | μg/L   | U |
| Fluorene                          | 2.10      | μg/L            | < | 2.10    | μg/L   | U |
| Indeno(1,2,3-cd)pyrene            | 0.430     | μg/L            | < | 0.430   | μg/L   | U |
| Naphthalene                       | 18.0      | μg/L            |   | 56.2    | μg/L   |   |



REPORT NUMBER : D97-8703-3

ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBONS | 3                |   |           |      |
|-----------------------------------|------------------|---|-----------|------|
| TEST REQUESTED                    | DETECTION, LIMIT |   | RESULTS   | FLAG |
| Phenanthrene                      | 6.40 µg/L        | < | 6.40 μg/L | U    |
| Pyrene                            | 2.70 μg/L        | < | 2.70 μg/L | U    |
| p-Terphenyl (SS)                  |                  |   | 7.63 µg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-3

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW44#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD : EPA 3510B

PREPARED BY : KDF

PREPARED ON: 16-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1

METHOD FACTOR : 1

OC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                 |           |      |
|--------------------------------|-----------------|-----------|------|
| TEST REQUESTED                 | DETECTION LIMIT | RESULTS   | FLAG |
| Total Extractable Hydrocarbons | 1000 μg/L       | 1470 μg/L |      |
| Triacontane (SS)               |                 | 233 μg/L  |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-3 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW44#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : CNA

PREPARED ON: 21-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT

ANALYZED ON: 21-JUL-1997

**DILUTION FACTOR: 25** METHOD FACTOR : 1

QC BATCH NO : 29072197RB

| TOTAL VOLATILE HYDROCARBONS |                 |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| Total Volatile Hydrocarbons | 25G0 μg/L       | 4640 μg/L | D    |
| Fluorobenzene (SS)          |                 | 112G μg/L | ס .  |

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-3

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS ID MARKS : GU-GMW44#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

| TOTAL METALS   |    |                 |               |      |
|----------------|----|-----------------|---------------|------|
| TEST REQUESTED |    | DETECTION LIMIT | RESULTS       | FLAG |
| Lead           | /1 | 0.0020 mg/L     | < 0.0020 mg/L | U    |

Dilution Factor: 1

Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD

QC Batch No : AC160-35F

DATE RECEIVED: 12-JUL-1997

REPORT NUMBER: D97-8703-3

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS ID MARKS : GU-GMW44#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

| MISCELLANEOUS ANALYSES |    |                 | •         |      |
|------------------------|----|-----------------|-----------|------|
| TEST REQUESTED         |    | DETECTION LIMIT | RESULTS   | FLAG |
| Sulfate                | /1 | 0.20 mg/L       | 0.40 mg/L |      |

Dilution Factor: 1

Analyzed using EPA 9056 on 21-JUL-1997 by LKD

QC Batch No : 32-0721971

DATE RECEIVED : 12-JUL-1997

REPORT · NUMBER : D97-8703-4 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW45#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997 PREPARATION METHOD : EPA 5030

PREPARED BY : MGD

PREPARED ON: 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    | <del></del>     |             |      |
|----------------------|-----------------|-------------|------|
| TEST REQUESTED       | DETECTION LIMIT | RESULTS     | FLAG |
| Acetone              | 20.0 μg/L       | < 20.0 μg/L | U    |
| Acrylonitrile        | 5.00 μg/L       | < 5.00 μg/L | U    |
| Benzene              | 5.00 μg/L       | < 5.00 μg/L | U    |
| Bromobenzene         | 5.00 μg/L       | < 5.00 μg/L | U    |
| Bromochloromethane   | 5.00 μg/L       | < 5.00 μg/L | U    |
| Bromodichloromethane | 5.00 μg/L       | < 5.00 μg/L | U    |
| Bromoform            | 5.00 μg/L       | < 5.00 μg/L | U    |
| Carbon disulfide     | 5.00 μg/L       | < 5.00 μg/L | U    |
| Carbon tetrachloride | 5.00 μg/L       | < 5.00 μg/L | U    |
| Chlorobenzene        | 5.00 μg/L       | < 5.00 μg/L | U    |
| Chloroethane         | 5.00 μg/L       | < 5.00 μg/L | U    |
| Chloroform           | 5.00 μg/L       | < 5.00 μg/L | u    |
| 2-Chlorotoluene      | 5.00 μg/L       | < 5.00 μg/L | U    |
| 4-Chlorotoluene      | 5.00 μg/L       | < 5.00 μg/L | U    |

REPORT NUMBER : D97-8703-4 ANALYSIS METHOD : EPA 8260 /1 PAGE 2

| VOLATILE ORGANICS           |           |       |    |         |      |      |
|-----------------------------|-----------|-------|----|---------|------|------|
| TEST REQUESTED              | DETECTION | LIMIT |    | RESULTS | 3    | FLAG |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | <  | 10.0    | μg/L | U    |
| Dibromochloromethane        | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | <  | 25.0    | μg/L | U    |
| 1,2-Dibromoethane           | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | <  | 100     | μg/L | U    |
| 1,1-Dichloroethane          | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 1,2-Dichloroethane          | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 1,1-Dichloroethene          | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | ۷. | 5.00    | μg/L | u    |
| 1,2-Dichloropropane         | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 2,2-Dichloropropane         | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 1,1-Dichloropropene         | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 1,3-Dichloropropane         | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| Ethylbenzene                | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 2-Hexanone                  | 50.0      | μg/L  | <  | 50.0    | μg/L | U    |
| Bromomethane                | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| Chloromethane               | 5.00      | μg/L  | <  | 5.00    | μg/L | υ    |
| Dibromomethane              | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |
| 2-Butanone                  | 100       | μg/L  | <  | 100     | μg/L | υ    |
| Iodomethane                 | 5.00      | μg/L  | <  | 5.00    | μg/L | U    |

REPORT NUMBER : D97-8703-4 ANALYSIS METHOD : EPA 8260 /1 PAGE 3

| TEST REQUESTED             | DETECTION | LIMIT |   | RESULT | S    | FLAG |
|----------------------------|-----------|-------|---|--------|------|------|
| Methylene chloride         | 5.00      | μg/L  | < | 5.00   | μg/L | U U  |
| 4-Methyl-2-pentanone       | 100       | μg/L  | < | 100    | μg/L | U    |
| Styrene                    | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1,1,2-Tetrachloroethane  | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1,2,2-Tetrachloroethane  | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Tetrachloroethene          | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Toluene                    | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2,3-Trichlorobenzene     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2,4-Trichlorobenzene     | 5.00      | μg/L  | < | 5.00   | μg/L | Ü    |
| 1,1,1-Trichloroethane      | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1,2-Trichloroethane      | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Trichloroethene            | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Trichlorofluoromethane     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2,3-Trichloropropane     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,3,5-Trimethylbenzene     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2,4-Trimethylbenzene     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Vinyl acetate              | 50.0      | μg/L  | < | 50.0   | μg/L | U    |
| Vinyl chloride             | 2.00      | μg/L  | < | 2.00   | μg/L | U    |
| m,p-Xylene                 | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| o-Xylene                   | 5.00      | μg/L  | < | 5.00   | μg/L | u    |
| Toluene-d8 (SS)            |           |       |   | 44.9   | μg/L |      |
| Bromofluorobenzene (SS)    |           |       |   | 52.0   | μg/L |      |
| 1,2-Dichloroethane-d4 (SS) |           |       | _ | 44.8   | μg/L |      |
| Dibromofluoromethane (SS)  |           |       |   | 47.1   | μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-4

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW45#

: N1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 9-JUL-1997

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR : 1

QC BATCH NO : 9707177001

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |         | -    |
|----------------------------------|----------------|----------|---------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT  | FLAG |
| No compounds detected above      |                | VOA      | 10 ug/L | N    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-4

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW45#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997 PREPARATION METHOD : EPA 3520B

PREPARED BY : TAP PREPARED ON : 16-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1 ANALYZED BY : JXA ANALYZED ON : 25-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 2

QC BATCH NO : AC142-74

| POLYNUCLEAR AROMATIC HYDROCARBONS | ,         |       |   | ·       |                        |      |
|-----------------------------------|-----------|-------|---|---------|------------------------|------|
| TEST REQUESTED                    | DETECTION | LIMIT |   | RESULTS |                        | FLAG |
| Acenaphthene                      | 30.6      | μg/L  | < | 30.6    | μg/L                   | U    |
| Accrophthylene =                  | 39.1      | μg/L. | < | 39.1    | μ <u>ς</u> /L. · . · · | υ    |
| Anthracene                        | 11.2      | μg/L  | < | 11.2    | μg/L                   | U    |
| Benzo(a)anthracene                | 0.221     | μg/L  | < | 0.221   | μg/L                   | U    |
| Benzo(a)pyrene                    | 0.204     | μg/L  | < | 0.204   | μg/L                   | U    |
| Benzo(b)fluoranthene              | 0.306     | μg/L  | < | 0.306   | μg/L                   | U    |
| Benzo(g,h,i)perylene              | 1.29      | μg/L  | < | 1.29    | μg/L                   | U    |
| Benzo(k)fluoranthene              | 0.289     | μg/L  | < | 0.289   | μg/L                   | U    |
| Chrysene                          | 2.55      | μg/L  | < | 2.55    | μg/L                   | U    |
| ນíbenz(a,n)anthracene             | 0.510     | μg/L  | < | 0.510   | μg/L                   | U    |
| Fluoranthene                      | 3.57      | μg/L  | < | 3.57    | μg/L                   | U    |
| Fluorene                          | 3.57      | μg/L  | < | 3.57    | μg/L                   | U    |
| Indeno(1,2,3-cd)pyrene            | 0.731     | μg/L  | < | 0.731   | μg/L                   | U    |
| Naphthalene                       | 30.6      | μg/L  | < | 30.6    | μg/L                   | U    |

REPORT NUMBER : D97-8703-4

ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | ıs              | •           |      |      |      |
|----------------------------------|-----------------|-------------|------|------|------|
| TEST REQUESTED                   | DEFECTION LIMIT | IIT RESULTS |      |      | FLAG |
| Phenanthrene                     | 10.9 μg/L       | <           | 10.9 | μg/L | U    |
| Pyrene                           | 4.59 µg/L       | <           | 4.59 | μg/L | U    |
| p-Terphenyl (SS)                 |                 |             | 13.8 | μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-4

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW45#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 9-JUL-1997 PREPARATION METHOD : EPA 3510B

PREPARED BY : KDF PREPARED ON : 16-JUL-1997

ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR : 1

METHOD FACTOR : 1 QC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                 |           |      |
|--------------------------------|-----------------|-----------|------|
| TEST REQUESTED                 | DETECTION LIMIT | RESULTS   | FLAG |
| Total Extractable Hydrocarbons | 1000 μg/L       | 63.0 μg/L | J    |
| Triacontane (SS)               |                 | 226 μg/L  |      |

DATE RECEIVED : 12-JUL-1997

REPORT ·NUMBER : D97-8703-4 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW45#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 9-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : CNA PREPARED ON : 21-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT ANALYZED ON : 21-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 29072197RB

| TOTAL VOLATILE HYDROCARBONS |                 |                         |      |
|-----------------------------|-----------------|-------------------------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS                 | FLAG |
| Total Volatile Hydrocarbons | 160 μg/L        | 17.2 μg/L               | J    |
| Fluorobenzene (SS)-         |                 | 47.2 μg/L  - |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-4 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW45#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 9-JUL-1997 ANALYSIS METHOD : RSK 175 /1 ANALYZED BY : LAJ ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : F071897-1

| DISSOLVED GASES IN WATER |                 |            |      |
|--------------------------|-----------------|------------|------|
| TEST REQUESTED           | DETECTION LIMIT | RESULTS    | FLAG |
| Methane                  | 0.5 рром        | < 0.5 ppbw | U    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-4

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc ADDRESS : 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW45#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 9-JUL-1997

| TOTAL METALS   |    |                 |             |      |
|----------------|----|-----------------|-------------|------|
| TEST REQUESTED |    | DETECTION LIMIT | RESULTS     | FLAG |
| Lead           | /1 | 0.0020 mg/L     | 0.0071 mg/L |      |

Dilution Factor: 1

Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD

QC Batch No : AC160-35F

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-4 REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW45#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 9-JUL-1997

| MISCELLANEOUS ANALYSES |    |                 |           |      |
|------------------------|----|-----------------|-----------|------|
| TEST REQUESTED         |    | DETECTION LIMIT | RESULTS   | FLAG |
| Sulfate                | /1 | 0.20 mg/L       | 2.76 mg/L |      |
| Dilution Factor : 1    |    |                 | ,         |      |

Analyzed using EPA 9056 on 21-JUL-1997 by LKD

QC Batch No : 32-0721971

DATE RECEIVED: 12-JUL-1997

REPORT NUMBER: D97-8703-6 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : FIELDQC#

: TB1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGD PREPARED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD

ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    | ·               |               |      |
|----------------------|-----------------|---------------|------|
| TEST REQUESTED       | DETECTION LIMIT | RESULTS       | FLAG |
| Acetone              | 20.0 μg/L       | < 20.0 μg/L   | U    |
| Acrylonitrile ······ | 5.CC - μg/L     | < 5.00 μg/L/· | Ü    |
| Benzene              | 5.00 μg/L       | < 5.00 μg/L   | U    |
| Bromobenzene         | 5.00 μg/L       | < 5.00 μg/L   | U    |
| Bromochloromethane   | 5.00 μg/L       | < 5.00 μg/L   | U    |
| Bromodichloromethane | 5.00 μg/L       | < 5.00 μg/L   | U    |
| Bromoform            | 5.00 μg/L       | < 5.00 μg/L   | U    |
| Carbon disulfide     | 5.00 μg/L       | < 5.00 μg/L   | U    |
| Carbon tetrachloride | 5.00 μg/L       | < 5.00 μg/L   | υ    |
| Chlorobenzene        | 5.00 μg/L       | < >.00 μg/L   | υ    |
| Chloroethane         | 5.00 μg/L       | < 5.00 μg/L   | U    |
| Chloroform           | 5.00 μg/L       | < 5.00 μg/L   | U    |
| 2-Chlorotoluene      | 5.00 μg/L       | < 5.00 μg/L   | U    |
| 4-Chlorotoluene      | 5.00 μg/L       | < 5.00 μg/L   | U    |

REPORT NUMBER : D97-8703-6 ANALYSIS METHOD : EPA 8260 /1

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| VOLATILE ORGANICS           |           |       |   |        |      | · · · · · · · · · · · · · · · · · · · |
|-----------------------------|-----------|-------|---|--------|------|---------------------------------------|
| TEST REQUESTED              | DETECTION | LIMIT |   | RESULT | s    | FLAG                                  |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | < | 10.0   | μg/L | U                                     |
| Dibromochloromethane        | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | < | 25.0   | μg/L | U                                     |
| 1,2-Dibromoethane           | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | < | 100    | μg/L | U                                     |
| 1,1-Dichloroethane          | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,2-Dichloroethane          | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,1-Dichloroethene          | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 2,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,1-Dichloropropene         | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 1,3-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| Ethylbenzene                | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 2-Hexanone                  | 50.0      | μg/L  | < | 50.0   | μg/L | U                                     |
| Bromomethane                | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| Chloromethane               | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| Dibromomethane              | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |
| 2-Butanone                  | 100       | μg/L  | < | 100    | μg/L | U                                     |
| Iodomethane                 | 5.00      | μg/L  | < | 5.00   | μg/L | U                                     |

REPORT NUMBER : D97-8703-6 ANALYSIS METHOD : EPA 8260 /1

PAGE 3

| VOLATILE ORGANICS          |                 |             |      |
|----------------------------|-----------------|-------------|------|
| TEST REQUESTED             | DETECTION LIMIT | RESULTS     | FLAG |
| Methylene chloride         | 5.00 µg/L       | < 5.00 μg/L | U    |
| 4-Methyl-2-pentanone       | 100 µg/L        | < 100 μg/L  | U    |
| Styrene                    | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,1,1,2-Tetrachloroethane  | 5.00 μg/L       | < 5.00 μg/L | u    |
| 1,1,2,2-Tetrachloroethane  | 5.00 μg/L       | < 5.00 μg/L | u    |
| Tetrachloroethene          | 5.00 μg/L       | < 5.00 μg/L | U    |
| Toluene                    | 5.00 μg/L       | < 5.00 μg/L | n    |
| 1,2,3-Trichlorobenzene     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,4-Trichlorobenzene     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,1,1-Trichloroethane      | 5.00 μg/L       | < 5.00 μg/L | υ    |
| 1,1,2-Trichloroethane      | 5.00 μg/L       | < 5.00 μg/L | U    |
| Trichloroethene            | 5.00 μg/L       | < 5.00 μg/L | U    |
| Trichlorofluoromethane     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,3-Trichloropropane     | 5.00 µg/L       | < 5.00 μg/L | U    |
| 1,3,5-Trimethylbenzene     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,4-Trimethylbenzene     | 5.00 μg/L       | < 5.00 μg/L | U    |
| Vinyl acetate              | 50.0 μg/L       | < 50.0 µg/L | U    |
| Vinyl chloride             | 2.00 μg/L       | < 2.00 μg/L | U    |
| m,p-Xylene                 | 5.00 μg/L       | < 5.00 μg/L | U    |
| o-Xylene                   | 5.00 μg/L       | < 5.00 μg/L | U    |
| Toluene-d8 (SS)            |                 | 50.7 μg/L   |      |
| Bromofluorobenzene (SS)    |                 | 59.4 μg/L   |      |
| 1,2-Dichloroethane-d4 (SS) |                 | 49.9 µg/L   |      |
| Dibromofluoromethane (SS)  |                 | 53.0 μg/L   |      |

DATE RECEIVED: 12-JUL-1997 · REPORT NUMBER: D97-8703-6

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : FIELDQC#

: TB1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 10-JUL-1997

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR: 1

QC BATCH NO : 9707177001

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |         |      |
|----------------------------------|----------------|----------|---------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT  | FLAG |
| No compounds detected above      |                | VOA      | 10 ug/L | N    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-7 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW3#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 10-JUL-1997
PREPARATION METHOD: EPA 5030
PREPARED BY: MGD
PREPARED ON: 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    |                   |               |      |
|----------------------|-------------------|---------------|------|
| TEST REQUESTED       | DETECTION LIMIT   | RESULTS       | FLAG |
| Acetone              | 20.0 μg/L         | < 20.0 μg/L   | U    |
| Acrylonitrile-       | 5.00··· μg/L····  | <: 5.00: μg/L | U    |
| Benzene              | 5.00 μg/L         | < 5.00 μg/L   | U    |
| Bromobenzene         | 5.00 μg/L         | < 5.00 μg/L   | U    |
| Bromochloromethane   | 5.00 μg/L         | < 5.00 μg/L   | U    |
| Bromodichloromethane | 5.00 μg/L         | < 5.00 μg/L   | U    |
| Bromoform            | 5.00 μg/L         | < 5.00 μg/L   | U    |
| Carbon disulfide     | 5.00 μg/L         | < 5.00 μg/L   | U    |
| Carbon tetrachloride | 5.00 μg/L         | < 5.00 μg/L   | U    |
| Chlorobenzene        | 5.ύ <b>0</b> μg/L | < 5.00 μg/L   | U    |
| Chloroethane         | 5.00 μg/L         | < 5.00 μg/L   | U    |
| Chloroform           | 5.00 μg/L         | < 5.00 μg/L   | U    |
| 2-Chlorotoluene      | 5.00 μg/L         | < 5.00 μg/L   | U    |
| 4-Chlorotoluene      | 5.00 μg/L         | < 5.00 μg/L   | U    |

REPORT NUMBER : D97-8703-7 ANALYSIS METHOD : EPA 8260 /1

PAGE 2

| VOLATILE ORGANICS           |             |       |         |      |      |
|-----------------------------|-------------|-------|---------|------|------|
| TEST REQUESTED              | DETECTION L | IMIT  | RESULTS | 3    | FLAG |
| 2-Chloroethylvinyl ether    | 16.0 μς     | g/L · | 10.0    | μg/L | U    |
| Dibromochloromethane        | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| 1,2-Dibromo-3-chloropropane | 25.0 μς     | g/L < | 25.0    | μg/L | U    |
| 1,2-Dibromoethane           | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| 1,2-Dichlorobenzene         | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| 1,3-Dichlorobenzene         | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| 1,4-Dichlorobenzene         | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| trans-1,4-Dichloro-2-butene | 100 μς      | g/L < | 100     | μg/L | U    |
| 1,1-Dichloroethane          | 5.00 μς     | g/L < | 5.00    | μg/L | u    |
| 1,2-Dichloroethane          | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| 1,1-Dichloroethene          | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| cis-1,2-Dichloroethene      | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| trans-1,2-Dichloroethene    | 5.00 μς     | g/L < | 5.00    | μg/L | U    |
| 1,2-Dichloropropane         | 5.00 μg     | g/L < | 5.00    | μg/L | U    |
| 2,2-Dichloropropane         | 5.00 μg     | 3/L < | 5.00    | μg/L | U    |
| 1,1-Dichloropropene         | 5.00 μg     | g/L < | 5.00    | μg/L | U    |
| 1,3-Dichloropropane         | 5.00 μg     | g/L < | 5.00    | μg/L | U    |
| cis-1,3-Dichloropropene     | 5.00 μg     | g/L < | 5.00    | μg/L | U    |
| trans-1,3-Dichloropropene   | 5.00 μg     | g/L < | 5.00    | μg/L | U    |
| Ethylbenzene                | 5.00 μg     | 3/L < | 5.00    | μg/L | U    |
| 2-Hexanone                  | 50.0 μg     | 3/L < | 50.0    | μg/L | U    |
| Bromomethane                | 5.00 μg     | 3/L < | 5.00    | μg/L | U    |
| Chloromethane               | 5.00 μg     | g/L < | 5.00    | μg/L | U    |
| Dibromomethane              | 5.00 μg     | 3/L < | 5.00    | μg/L | U    |
| 2-Butanone                  | 100 μg      | 3/L < | 100     | μg/L | U    |
| Iodomethane                 |             | 3/L < | 5.00    | μg/L | U    |

REPORT NUMBER : D97-8703-7 ANALYSIS METHOD : EPA 8260 /1

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| VOLATILE ORGANICS          |             |          |    |        |      |      |
|----------------------------|-------------|----------|----|--------|------|------|
| TEST REQUESTED             | DETECTION L | IMIT     |    | RESULT | s    | FLAG |
| Methylene chloride         | 5.00 да     | g/L      | <  | 5.00   | μg/L | Ü    |
| 4-Methyl-2-pentanone       | 100 дз      | g/L      | <  | 100    | μg/L | U    |
| Styrene                    | 5.00 μς     | g/L      | <  | 5.00   | μg/L | U    |
| 1,1,1,2-Tetrachloroethane  | 5.00 да     | g/L      | <  | 5.00   | μg/L | U    |
| 1,1,2,2-Tetrachloroethane  | 5.00 μς     | g/L      | <  | 5.00   | μg/L | U    |
| Tetrachloroethene          | 5.00 μς     | g/L      | <  | 5.00   | μg/L | U    |
| Toluene                    | 5.00 μς     | g/L      | <  | 5.00   | μg/L | U    |
| 1,2,3-Trichtorobenzene     | 5.00 μς     | g/L      | <  | 5.00   | μg/L | U    |
| 1,2,4-Trichlorobenzene     | 5.00 μς     | g/L      | <  | 5.00   | μg/L | U    |
| 1,1,1-Trichloroethane      | 5.00 μς     | g/L      | <  | 5.00   | μg/L | U    |
| 1,1,2-Trichloroethane      | 5.00 μς     | 9/L      | <' | 5.00   | μg/L | ü    |
| Trichloroethene            | 5.00 μς     | 3/L      | <  | 5.00   | μg/L | U    |
| Trichlorofluoromethane     | 5.00 μg     | 3/L      | <  | 5.00   | μg/L | U    |
| 1,2,3-Trichloropropane     | 5.00 μg     | 3/L      | <  | 5.00   | μg/L | U    |
| 1,3,5-Trimethylbenzene     | 5.00 μg     | g/L      | <  | 5.00   | μg/L | U    |
| 1,2,4-Trimethylbenzene     | 5.00 μg     | 3/L      | <  | 5.00   | μg/L | U    |
| Vinyl acetate              | 50.0 μg     | ı/L      | <  | 50.0   | μg/L | U    |
| Vinyl chloride             | 2.00 дд     | 1/L      | <  | 2.00   | μg/L | U    |
| m,p-Xylene                 | 5.00 дд     | ı/L      | <  | 5.00   | μg/L | U    |
| o-Xylene                   | 5.00 μg     | /L       | <  | 5.00   | μg/L | U    |
| Toluene-d8 (SS)            |             |          |    | 48.2   | μg/L |      |
| Bromofluorobenzene (SS)    |             | <u> </u> |    | 57.9   | μg/L |      |
| 1,2-Dichloroethane-d4 (SS) |             |          |    | 49.0   | μg/L |      |
| Dibromofluoromethane (SS)  |             |          |    | 51.4   | μg/L |      |

DATE RECEIVED : 12-JUL-1997

· REPORT NUMBER : D97-8703-7

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW3#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 10-JUL-1997

ANALYZED BY : MGD

ANALYZED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR : 1

QC BATCH NO : 9707177001

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |         |      |
|----------------------------------|----------------|----------|---------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT  | FLAG |
| No compounds detected above      |                | VOA      | 10 ug/L | N    |

DATE RECEIVED : 12-JUL-1997 ·

REPORT NUMBER: D97-8703-7 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW3#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD: EPA 3520B
PREPARED BY: TAP
PREPARED ON: 16-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 25-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-74

| POLYNUCLEAR AROMATIC HYDROCARBONS | · .             |                   |      |
|-----------------------------------|-----------------|-------------------|------|
| TEST REQUESTED                    | DETECTION LIMIT | RESULTS           | FLAG |
| Acenaphthene                      | 18.0 μg/L       | < 18.0 μg/L       | U    |
| Accnaphthylene                    | 23.0 ··· μg/L·  | < 23.0 π μg/t σ σ | Ü    |
| Anthracene                        | 6.60 μg/L       | < 6.60 μg/L       | U    |
| Benzo(a)anthracene                | 0.130 μg/L      | < 0.130 μg/L      | U    |
| Benzo(a)pyrene                    | 0.120 μg/L      | < 0.120 μg/L      | U    |
| Benzo(b)fluoranthene              | 0.180 μg/L      | < 0.180 μg/L      | U    |
| Benzo(g,h,i)perylene              | 0.760 μg/L      | < 0.760 μg/L      | U    |
| Benzo(k)fluoranthene              | 0.170 μg/L      | < 0.170 μg/L      | U    |
| Chrysene                          | 1.50 μg/L       | < 1.50 μg/L       | U    |
| Dibenz(a,h)anthracene             | ύ.300 μg/L      | < 0.300 μg/L      | U    |
| Fluoranthene                      | 2.10 μg/L       | < 2.10 μg/L       | U    |
| fluorene                          | 2.10 μg/L       | < 2.10 μg/L       | U    |
| Indeno(1,2,3-cd)pyrene            | 0.430 μg/L      | < 0.430 μg/L      | U    |
| Naphthalene                       | 18.0 μg/L       | < 18.0 μg/L       | U    |

REPORT NUMBER : D97-8703-7 ANALYSIS METHOD : EPA 8310 PR /1

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| POLYNUCLEAR AROMATIC HYDROCARBON | rs              |             |      |
|----------------------------------|-----------------|-------------|------|
| TEST REQUESTED .                 | DETECTION LIMIT | RESULTS     | FLAG |
| Phenanthrene                     | ó.40 μg/L       | < 6.40 μg/L | U    |
| Pyrene                           | 2.70 μg/L       | < 2.70 μg/L | U    |
| p-Terphenyl (SS)                 |                 | 8.84 µg/L   |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-7

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW3#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD : EPA 3510B

PREPARED BY : KDF

PREPARED ON : 16-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY: VHL
ANALYZED ON: 17-JUL-1997
DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                 |           |      |
|--------------------------------|-----------------|-----------|------|
| TEST REQUESTED                 | DETECTION LIMIT | RESULTS   | FLAG |
| Total Extractable Hydrocarbons | 1000 μg/L       | 97.0 µg/L | J    |
| Triacontane (CS)               |                 | 234 µg/L  |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-7 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW3#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD: EPA 5030
PREPARED BY: LLB
PREPARED ON: 16-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT

ANALYZED ON: 20-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 29072097RB

| TOTAL VOLATILE HYDROCARBONS |                 |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| Total Volatile Hydrocarbons | 100 μg/L        | 46.5 μg/L | J    |
| Fluorobenzene (SS)          |                 | 47.4 µg/L |      |

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-7

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW3#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 10-JUL-1997

| TOTAL METALS   |    |                 |   |             |      |
|----------------|----|-----------------|---|-------------|------|
| TEST REQUESTED |    | DETECTION LIMIT |   | RESULTS     | FLAG |
| Lead           | /1 | 0.0020 mg/L     | < | 0.0020 mg/L | U    |

Dilution Factor: 1 Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD QC Batch No : AC160-35F

DATE RECEIVED:: 12-JUL-1997 REPORT NUMBER: D97-8703-7

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW3#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 10-JUL-1997

| MISCELLANEOUS ANALYSES |    |                 |           |            |
|------------------------|----|-----------------|-----------|------------|
| TEST REQUESTED         |    | DETECTION LIMIT | RESULTS   | FLAG       |
| Sulfate                | /1 | 0.20 mg/L       | 0.34 mg/L | <b>.</b> . |

Dilution Factor: 1

Analyzed using EPA 9056 on 21-JUL-1997 by LKD

QC Batch No : 32-0721971

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER ·: D97-8703-8

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW4#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGD

PREPARED ON: 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    |                 |      |           |      |
|----------------------|-----------------|------|-----------|------|
| TEST REQUESTED       | DETECTION LIMIT |      | RESULTS   | FLAG |
| Acetone              | 20.0 μg/L       | <    | 20.0 μg/L | U    |
| Acrylonitrile ··     | 5'.00 · μg/L··· | . <. | 5.00 سي/ن | Ľ    |
| Benzene              | 5.00 μg/L       |      | 13.4 μg/L |      |
| Bromobenzene         | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| Bromochloromethane   | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| Bromodichloromethane | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| Bromoform            | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| Carbon disulfide     | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| Carbon tetrachloride | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| Chlorobenzene        | >.00 μg/L       | <    | 5.00 μg/L | U    |
| Chloroethane         | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| Chloroform           | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| 2-Chlorotoluene      | 5.00 μg/L       | <    | 5.00 μg/L | U    |
| 4-Chlorotoluene      | 5.00 μg/L       | <    | 5.00 μg/L | U    |

REPORT NUMBER : D97-8703-8 ANALYSIS METHOD : EPA 8260 /1

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| VOLATILE ORGANICS           | ·         |       |   |         |      |      |
|-----------------------------|-----------|-------|---|---------|------|------|
| TEST REQUESTED              | DETECTION | LIMIT |   | RESULTS | 3    | FLAG |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | < | 10.0    | μg/L | U    |
| Dibromochloromethane        | 5.00      | μg/L  | < | 5.00    | μg/L | υ    |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | < | 25.0    | μg/L | υ    |
| 1,2-Dibromoethane           | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | < | 100     | μg/L | U    |
| 1,1-Dichloroethane          | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 1,2-Dichloroethane          | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 1,1-Dichloroethene          | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 1,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 2,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 1,1-Dichloropropene         | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 1,3-Dichloropropane         | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 2-Hexanone                  | 50.0      | μg/L  | < | 50.0    | μg/L | U    |
| Bromomethane                | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| Chloromethane               | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| Dibromomethane              | 5.00      | μg/L  | < | 5.00    | μg/L | U    |
| 2-Butanone                  | 100       | μg/L  | < | 100     | μg/L | U    |
| Iodomethane                 | 5.00      | μg/L  | < | 5.00    | μg/L | υ    |
| Methylene chloride          | 5.00      | μg/L  |   | 5.00    | μg/L | U    |

· REPORT NUMBER : D97-8703-8 ANALYSIS METHOD : EPA 8260 /1 PAGE 3

| TEST REQUESTED             | DETECTION LIMIT | RESULTS     | FLAG |
|----------------------------|-----------------|-------------|------|
|                            | DETECTION CHAIT | RESOLIS     | FEAG |
| 4-Methyl-2-pentanone       | 1GO μg/L        | < 100 μg/L  | U    |
| Styrene                    | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,1,1,2-Tetrachloroethane  | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,1,2,2-Tetrachloroethane  | 5.00 μg/L       | < 5.00 μg/L | U    |
| Tetrachloroethene          | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,3-Trichlorobenzene     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,4-Trichlorobenzene     | 5.00° μg/L      | < 5.00 μg/L | υ    |
| 1,1,1-Trichloroethane      | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,1,2-Trichloroethane      | 5.00 μg/L       | < 5.00 μg/L | U    |
| Trichloroethene            | 5.00 μg/L       | < 5.00 μg/L | U    |
| Trichlorofluoromethane     | 5.00 μg/L       | < 5.00 μg/L | U    |
| 1,2,3-Trichloropropane     | 5.00 μg/L       | < 5.00 μg/L | U    |
| Vinyl acetate              | 50.0 μg/L       | < 50.0 μg/L | U    |
| Vinyl chloride             | 2.00 μg/L       | < 2.00 μg/L | U    |
| Toluene-d8 (SS)            | ·               | 49.0 μg/L   |      |
| Bromofluorobenzene (SS)    |                 | 56.4 μg/L   |      |
| 1,2-Dichloroethane-d4 (SS) |                 | 49.7 μg/L   |      |
| Dibromofluoromethane (SS)  |                 | 50.7 μg/L   |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-8 REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS ID MARKS : GU-GMW4#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR: 1

QC BATCH NO : 9707177001

| TENTATIVELY IDENTIFIED COMPOUNDS   |                |          |         |      |
|------------------------------------|----------------|----------|---------|------|
| COMPOUND                           | RETENTION TIME | FRACTION | RESULT  | FLAG |
| Butane, 2-methyl-                  | 2.09           | VOA      | 58 ug/L | N    |
| Pentane                            | 2.37           | VOA      | 29 ug/L | N    |
| Cyclopropane, 1,1-dimethyl-        | 2.52           | VOA      | 12 ug/L | N    |
| Pentane, 3-methyl-                 | 3.89           | VOA      | 23 ug/L | И    |
| 3-Hexene, (Z)-                     | 4.61           | VOA      | 12 ug/L | N    |
| 3-Hexyne                           | 4.90           | VOA      | 11 ug/L | N    |
| Cyclopentane, methyl-              | 5.25           | VOA      | 60 ug/L | N    |
| 2,4-Hexadiene                      | 6.72           | VOA      | 98 ug/L | N    |
| Cyclohexane, methyl-               | 7.65           | VOA      | 65 ug/L | N    |
| 3,5-Dimethylcyclopentene           | 8.34           | VOA      | 28 ug/L | N    |
| Benzene, (1-methylethyl)-          | 12.48          | VOA      | 49 ug/L | N    |
| Benzene, 2-ethyl-1,3-dimethyl-     | 13.86          | VOA      | 11 ug/L | N    |
| Benzene, 1-methyl-2-(1-methylethyl | 14.35          | VOA      | 15 ug/L | N    |

REPORT NUMBER : D97-8703-8 ANALYSIS METHOD : EPA 8260 /1

PAGE 2

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |          |      |
|----------------------------------|----------------|----------|----------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT   | FLAG |
| 1H-Indene, 2,3-dihydro-4-methyl- | 14.84          | VOA      | 13 ug/L  | N    |
| Naphthalene                      | 15.51          | VOA      | 669 ug/L | N    |

DATE RECEIVED : 12-JUL-1997

· REPORT NUMBER : D97-8703-8

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW4#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997

PREPARATION METHOD : EPA 3520B

PREPARED BY : TAP PREPARED ON : 16-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA

ANALYZED ON: 25-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-74

| TEST REQUESTED         | DETECTION LIMIT | RESULTS         | FLAG |
|------------------------|-----------------|-----------------|------|
| Acenaphthene           | 18.0 μg/L       | < 18.0 μg/L     | U    |
| Acenaphthylene ···     | 23.0 ·· μg/L··· | < 23.0 μg/L- ·· | U    |
| Anthracene             | 6.60 µg/L       | < 6.60 μg/L     | U    |
| Benzo(a)anthracene     | 0.130 μg/L      | < 0.130 μg/L    | U    |
| Benzo(a)pyrene         | 0.120 μg/L      | < 0.120 μg/L    | U    |
| Benzo(b)fluoranthene   | 0.180 μg/L      | < 0.180 μg/L    | U    |
| Benzo(g,h,i)perylene   | 0.760 μg/L      | < 0.760 μg/L    | U    |
| Benzo(k)fluoranthene   | 0.170 μg/L      | < 0.170 μg/L    | υ    |
| Chrysene               | 1.50 μg/L       | < 1.50 μg/L     | U ·  |
| Dibenz(a,n)anthracene  | 0.300 μg/L      | < 0.300 μg/L    | U    |
| Fluoranthene           | 2.10 μg/L       | < 2.10 μg/L     | U    |
| Fluorene               | 2.10 μg/L       | < 2.10 μg/L     | U    |
| Indeno(1,2,3-cd)pyrene | 0.430 μg/L      | < 0.430 μg/L    | U    |
| Naphthalene            | 18.0 μg/L       | 624 µg/L        |      |

REPORT NUMBER : D97-8703-8

ANALYSIS METHOD : EPA 8310 PR /1

PAGE 2

| POLYNUCLEAR AROMATIC HYDROCARBON | S .             |   |           |      |
|----------------------------------|-----------------|---|-----------|------|
| TEST REQUESTED                   | DETECTION LIMIT |   | RESULTS   | FLAG |
| Phenanthrene                     | 6.40 μg/L       | < | 6.40 µg/L | Ü    |
| Pyrene                           | 2.70 μg/L       | < | 2.70 μg/L | U    |
| p-Terphenyl (SS)                 |                 |   | 6.50 µg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-8

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW4#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 10-JUL-1997

PREPARATION METHOD : EPA 3510B

PREPARED BY : KDF

PREPARED ON: 16-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY: VHL
ANALYZED ON: 17-JUL-1997
DILUTION FACTOR: 1

METHOD FACTOR : 1

QC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                 |           |      |
|--------------------------------|-----------------|-----------|------|
| TEST REQUESTED                 | DETECTION LIMIT | RESULTS   | FLAG |
| Total Extractable Hydrocarbons | 1000 μg/L       | 7500 μg/L |      |
| Triacontane (SS)               |                 | 231 µg/L  |      |

DATE RECEIVED : 12-JUL-1997 · REPORT NUMBER : D97-8703-8

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW4#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 10-JUL-1997 PREPARATION METHOD: EPA 5030

PREPARED BY : CNA

PREPARED ON : 21-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT

ANALYZED ON : 21-JUL-1997

**DILUTION FACTOR: 50** METHOD FACTOR : 1

QC BATCH NO : 29072197RB

| TOTAL VOLATILE HYDROCARBONS |                 |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| Total Volatile Hydrocarbons | 5000 µg/L       | 8930 µg/L | D    |
| Fluorobenzene (SS)          |                 | 2330 μg/L | D    |

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-8 · REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW4#

: N1#(0-0')
PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 10-JUL-1997
ANALYSIS METHOD: RSK 175 /1
ANALYZED BY: LAJ
ANALYZED ON: 18-JUL-1997
DILUTION FACTOR: 1

METHOD FACTOR : 1

QC BATCH NO : F071897-1

| DISSOLVED GASES IN WATER |                 |          |      |
|--------------------------|-----------------|----------|------|
| TEST REQUESTED           | DETECTION LIMIT | RESULTS  | FLAG |
| Methane                  | 0.5 ррbы        | 6.4 ррын |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-8

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW4#

: N1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 10-JUL-1997

| TOTAL METALS   |    |                 |             |      |
|----------------|----|-----------------|-------------|------|
| TEST REQUESTED |    | DETECTION LIMIT | RESULTS     | FLAG |
| Lead           | /1 | 0.0020 mg/L     | 0.0069 mg/L |      |

Dilution Factor: 1

Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD

QC Batch No : AC160-35F

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-8

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc ADDRESS : 1700 Broadway, Ste: 900 : Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW4#

: N1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 10-JUL-1997

| TEST REQUESTED |    | DETECTION LIMIT | RESULTS   | FLAG |
|----------------|----|-----------------|-----------|------|
| Sulfate        | /1 | 0.20 mg/L       | 0.18 mg/L | J    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-9 REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : FIELDQC#

: TB2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 11-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGD PREPARED ON : 18-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 9707187001

| VOLATILE ORGANICS    |                 |             |      |
|----------------------|-----------------|-------------|------|
| TEST REQUESTED       | DETECTION LIMIT | RESULTS     | FLAG |
| Acetone              | 20.G μg/L       | < 20.0 μg/L | U    |
| Acrylonitrile -      | 5.00 ··· μg/L   | < 5.00 μg/L | U    |
| Benzene              | 5.00 μg/L       | < 5.00 μg/L | U    |
| Bromobenzene         | 5.00 μg/L       | < 5.00 μg/L | U    |
| Bromochloromethane   | 5.00 μg/L       | < 5.00 μg/L | U    |
| Bromodichloromethane | 5.00 μg/L       | < 5.00 μg/L | U    |
| Bromoform            | 5.00 μg/L       | < 5.00 μg/L | U    |
| Carbon disulfide     | 5.00 μg/L       | < 5.00 μg/L | U    |
| Carbon tetrachloride | 5.00 μg/L       | < 5.00 μg/L | U    |
| Chlorobenzene        | 5.00 μg/L       | < 5.00 μg/L | U    |
| Chloroethane         | 5.00 μg/L       | < 5.00 μg/L | U    |
| Chloroform           | 5.00 μg/L       | < 5.00 μg/L | IJ   |
| 2-Chlorotoluene      | 5.00 μg/L       | < 5.00 µg/L | U    |
| 4-Chlorotoluene      | 5.00 μg/L       | < 5.00 μg/L | U    |

REPORT NUMBER : D97-8703-9 ANALYSIS METHOD : EPA 8260 /1 PAGE 2

| VOLATILE ORGANICS           |           |       | ·          |         |      |      |
|-----------------------------|-----------|-------|------------|---------|------|------|
| TEST REQUESTED              | DETECTION | LIMIT |            | RESULTS | 3    | FLAG |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | <          | 10.0    | μg/L | U    |
| Dibromochloromethane        | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | <          | 25.0    | μg/L | U    |
| 1,2-Dibromoethane           | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | <          | 100     | μg/L | U    |
| 1,1-Dichloroethane          | 5.00      | μg/l  | <          | 5.00    | μg/L | U    |
| 1,2-Dichloroethane          | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 1,1-Dichloroethene          | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 1,2-Dichloropropane         | 5.00      | μg/L  | <b>4</b> . | 5.00    | μg/L | U    |
| 2,2-Dichloropropane         | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 1,1-Dichloropropene         | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 1,3-Dichloropropane         | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| Ethylbenzene                | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 2-Hexanone                  | 50.0      | μg/L  | <          | 50.0    | μg/L | U    |
| Bromomethane                | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| Chloromethane               | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| Dibromomethane              | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |
| 2-Butanone                  | 100       | μg/L  | <          | 100     | μg/L | U    |
| Iodomethane                 | 5.00      | μg/L  | <          | 5.00    | μg/L | U    |

REPORT NUMBER : D97-8703-9 ANALYSIS METHOD : EPA 8260 /1

PAGE 3

| VOLATILE ORGANICS          |                 |             |                |
|----------------------------|-----------------|-------------|----------------|
| TEST REQUESTED             | DETECTION LIMIT | RESULTS     | FLAG           |
| Methylene chloride         | 5.00 μg/L       | < 5.00 μg/L | U              |
| 4-Methyl-2-pentanone       | 100 μg/L        | < 100 μg/L  | U              |
| Styrene                    | 5.00 μg/L       | < 5.00 μg/L | U              |
| 1,1,1,2-Tetrachloroethane  | 5.00 μg/L       | < 5.00 μg/L | U              |
| 1,1,2,2-Tetrachloroethane  | 5.00 μg/L       | < 5.00 μg/L | U              |
| Tetrachloroethene          | 5.00 μg/L       | < 5.00 μg/L | U              |
| Toluene                    | 5.00 μg/L       | < 5.00 μg/L | U              |
| 1,2,3-Trichlorobenzene     | 5.00 μg/L       | < 5.00 μg/L | U _. |
| 1,2,4-Trichlorobenzene     | 5.00 μg/L       | < 5.00 μg/L | U              |
| 1,1,1-Trichloroethane      | 5.00 μg/L       | < 5.00 μg/L | U              |
| 1,1,2-Trichloroethane      | 5.00 μg/L       | < 5.00 μg/L | U              |
| Trichloroethene            | 5.00 μg/L       | < 5.00 μg/L | U              |
| Trichlorofluoromethane     | 5.00 μg/L       | < 5.00 μg/L | U              |
| 1,2,3-Trichloropropane     | 5.00 μg/L       | < 5.00 μg/L | U              |
| 1,3,5-Trimethylbenzene     | 5.00 μg/L       | < 5.00 μg/L | U              |
| 1,2,4-Trimethylbenzene     | 5.00 μg/L       | < 5.00 μg/L | U              |
| Vinyl acetate              | 50.0 μg/L       | < 50.0 μg/L | U              |
| Vinyl chloride             | 2.00 μg/L       | < 2.00 μg/L | U              |
| m,p-Xylene                 | 5.00 μg/L       | < 5.00 μg/L | U              |
| o-Xylene                   | 5.00 μg/L       | < 5.00 μg/L | U              |
| Toluene-d8 (SS)            |                 | 50.5 μg/L   |                |
| Bromofluorobenzene (SS)    |                 | 56.8 μg/L   |                |
| 1,2-Dichloroethane-d4 (SS) |                 | 51.6 μg/L   |                |
| Dibromofluoromethane (SS)  |                 | 50.2 μg/L   |                |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-9

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : FIELDQC#

: TB2#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 11-JUL-1997

ANALYZED BY : MGD ANALYZED ON : 18-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR : 1

QC BATCH NO : 9707187001

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |         |      |
|----------------------------------|----------------|----------|---------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT  | FLAG |
| No compounds detected above      |                | VOA      | 10 ug/L | N    |

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-10

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABOC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 12-JUL-1997
PREPARATION METHOD: EPA 5030
PREPARED BY: MGD
PREPARED ON: 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    |                 |                    |      |
|----------------------|-----------------|--------------------|------|
| TEST REQUESTED       | DETECTION LIMIT | RESULTS            | FLAG |
| Acetone              | 20.0 μg/L       | < 20.0 μg/L        | U    |
| Acrylonitrile        | 5.00~- μg/L ··· | <1 5.00 ± π μg/L11 | U·   |
| Benzene              | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Bromobenzene         | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Bromochloromethane   | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Bromodichloromethane | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Bromoform            | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Carbon disulfide     | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Carbon tetrachloride | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Chlorobenzene        | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Chloroethane         | 5.00 μg/L       | < 5.00 μg/L        | U    |
| Chloroform           | 5.00 μg/L       | < 5.00 μg/L        | u    |
| 2-Chlorotoluene      | 5.00 μg/L       | < 5.00 μg/L        | υ    |
| 4-Chlorotoluene      | 5.00 μg/L       | < 5.00 μg/L        | U    |

REPORT NUMBER : D97-8703-10 ANALYSIS METHOD : EPA 8260 /1

PAGE 2

| VOLATILE ORGANICS           |           |       |   |        |      |      |
|-----------------------------|-----------|-------|---|--------|------|------|
| TEST REQUESTED              | DETECTION | LIMIT |   | RESULT | s    | FLAG |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | < | 10.0   | μg/L | U    |
| Dibromochloromethane        | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | < | 25.0   | μg/L | U    |
| 1,2-Dibromoethane           | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | · U  |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | < | 100    | μg/L | U_   |
| 1,1-Dichloroethane          | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2-Dichloroethane          | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1-Dichloroethene          | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 2,2-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,1-Dichloropropene         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 1,3-Dichloropropane         | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Ethylbenzene                | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| 2-Hexanone                  | 50.0      | μg/L  | < | 50.0   | μg/L | U    |
| Bromomethane                | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Chloromethane               | 5.00      | μg/L  | < | 5.00   | μg/L | U    |
| Dibromomethane              | 5.00      | μg/L  | < | 5.00   | μg/L | Ü    |
| 2-Butanone                  | 100       | μg/L  | < | 100    | μg/L | U    |
| Iodomethane                 | 5.00      | μg/L  | < | 5.00   | μg/L | U    |

REPORT NUMBER : D97-8703-10 ANALYSIS METHOD : EPA 8260 /1

PAGE 3

| TEST REQUESTED             | DETECTION L | IMIT |                | RESULT |        | T 51.40     |
|----------------------------|-------------|------|----------------|--------|--------|-------------|
|                            |             |      | _              |        |        | FLAG        |
| Methylene chloride         |             | ıg/L | <              | 5.00   | μg/L   | U           |
| 4-Methyl-2-pentanone       | 100 μ       | ıg/L | <              | 100    | μg/L   | U.          |
| Styrene                    | 5.00 д      | ig/L | <              | 5.00   | μg/L   | U           |
| 1,1,1,2-Tetrachloroethane  | 5.00 μ      | .g/L | <              | 5.00   | μg/L   | U           |
| 1,1,2,2-Tetrachloroethane  | 5.00 μ      | :g/L | <              | 5.00   | μg/L   | U           |
| Tetrachloroethene          | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| Toluene                    | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| 1,2,3-Trichlorobenzene     | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| 1,2,4-Trichlorobenzene     | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| 1,1,1-Trichloroethane      | 5.00 μ      | g/L  | <              | 5.00   | μg/L . | U           |
| 1,1,2-Trichloroethane      | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| Trichloroethene            | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| Trichlorofluoromethane     | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| 1,2,3-Trichloropropane     | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| 1,3,5-Trimethylbenzene     | 5.00 μ      | g/L  | <              | 5.00   | μg/L   | U           |
| 1,2,4-Trimethylbenzene     | 5.00 д      | g/L  | <              | 5.00   | μg/L   | U           |
| Vinyl acetate              | 50.0 д      | g/L  | <              | 50.0   | μg/L   | U           |
| Vinyl chloride             | 2.00 μ      | g/L  | <              | 2.00   | μg/L   | U           |
| m,p-Xylene                 | 5.00 д      | g/L  | <              | 5.00   | μg/L   | U           |
| o-Xylene                   | 5.00 д      | g/L  | <              | 5.00   | μg/L   | U           |
| Toluene-d8 (SS)            |             |      |                | 53.2   | μg/L   |             |
| Bromofluorobenzene (SS)    |             |      |                | 59.8   | μg/L   |             |
| 1,2-Dichloroethane-d4 (SS) |             |      | <del>-  </del> | 51.8   | μg/L   |             |
| Dibromofluoromethane (SS)  |             |      |                | 51.7   | μg/L   | <del></del> |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-10

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex
DATE SAMPLED: 12-JUL-1997
ANALYZED BY: MGD
ANALYZED ON: 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR: 1

QC BATCH NO : 9707177001

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |         | •    |
|----------------------------------|----------------|----------|---------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT  | FLAG |
| No compounds detected above      | ·              | VOA      | 10 ug/L | N    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-10

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABOC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

PREPARATION METHOD: EPA 3520B
PREPARED BY: TAP
PREPARED ON: 16-JUL-1997

ANALYSIS METHOD : EPA 8310 PR /1 ANALYZED BY : JXA ANALYZED ON : 24-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-74

| TEST REQUESTED         | DETECTION LIMIT   | RESULTS      | FLAG |
|------------------------|-------------------|--------------|------|
| Acenaphthene           | 18.0 µg/L         | < 18.0 μg/L  | U    |
| Acenaph thylene        | 23.0 · / µ3/L···· | < 23.0 μg/L  | U    |
| Anthracene             | 6.60 µg/L         | < 6.60 μg/L  | U    |
| Benzo(a)anthracene     | 0.130 µg/L        | < 0.130 μg/L | U    |
| Benzo(a)pyrene         | 0.120 μg/L        | < 0.120 μg/L | U    |
| Benzo(b)fluoranthene   | 0.180 μg/L        | < 0.180 μg/L | U    |
| Benzo(g,h,i)perylene   | 0.760 µg/L        | < 0.760 μg/L | U    |
| Benzo(k)fluoranthene   | 0.170 μg/L        | < 0.170 μg/L | U    |
| Chrysene               | 1.50 µg/L         | < 1.50 μg/L  | U    |
| Dibenz(a,n)anthracene  | 0.300 μg/L        | < 0.300 μg/L | U    |
| Fluoranthene           | 2.10 µg/L         | < 2.10 μg/L  | U    |
| Fluorene               | 2.10 μg/L         | < 2.10 μg/L  | U    |
| Indeno(1,2,3-cd)pyrene | 0.430 μg/L        | < 0.430 μg/L | U    |
| Naphthalene            | 18.0 μg/L         | < 18.0 μg/L  | U    |

REPORT NUMBER : D97-8703-10 ANALYSIS METHOD : EPA 8310 PR /1

| POLYNUCLEAR AROMATIC HYDROCARBONS |                 |   |           | -    |
|-----------------------------------|-----------------|---|-----------|------|
| TEST REQUESTED                    | DETECTION LIMIT |   | RESULTS   | FLAG |
| Phenanthrene                      | 6.40 µg/L       | < | 6.40 μg/L | u    |
| Pyrene                            | 2.70 µg/L       | < | 2.70 μg/L | U    |
| p-Terphenyl (SS)                  |                 |   | 8.51 μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-10

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABOC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 12-JUL-1997

PREPARATION METHOD : EPA 3510B

PREPARED BY : KDF

PREPARED ON: 16-JUL-1997 ANALYSIS METHOD : EPA 8015M /1

ANALYZED BY : VHL ANALYZED ON : 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR: 1

QC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                 |             | <del></del> |
|--------------------------------|-----------------|-------------|-------------|
| TEST REQUESTED                 | DETECTION LIMIT | RESULTS     | FLAG        |
| Total Extractable Hydrocarbons | 1000 µg/L       | 89.0 μg/L   | J           |
| Triacontane (3S)               |                 | 195 μg/L··· |             |

DATE RECEIVED: 12-JUL-1997

REPORT NUMBER: D97-8703-10

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED: 12-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : VHT PREPARED ON : 20-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1 ANALYZED BY : VHT ANALYZED ON : 20-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 29072097RB

| TOTAL VOLATILE HYDROCARBONS |         |          |          |        |      |      |
|-----------------------------|---------|----------|----------|--------|------|------|
| TEST REQUESTED              | DETECTI | ON LIMIT | <u> </u> | RESULT | rs · | FLAG |
| Total Volatile Hydrocarbons | 100     | μg/L     | <        | 100    | μg/L | U    |
| Fluorobenzener(SS)          |         |          |          | 47.5   | μg/L | +    |

Intertek Testing Services NA Inc. 1089 East Collins Boulevard Richardson, TX 75081 Telephone (972) 238-5591 Fax (972) 238-5592

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER ·: D97-8703-10

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABOC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997 ANALYSIS METHOD: RSK 175 /1
ANALYZED BY: LAJ
ANALYZED ON: 18-JUL-1997
DILUTION FACTOR: 1
METHOD FACTOR: 1

QC BATCH NO : F071897-1

| DISSOLVED GASES IN WATER |                |   |          |      |
|--------------------------|----------------|---|----------|------|
| TEST REQUESTED           | DETECTION LIMI | т | RESULTS  | FLAG |
| Methane                  | 0.5 рры        | < | 0.5 ppbw | U    |
| Ethane                   | 0.5 ppbw       | < | 0.5 ppbw | U    |
| Ethene                   | 0.5 ppbw       | < | 0.5 ppbw | U    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-10

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: LB1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

| TOTAL METALS   |                 |             |      |
|----------------|-----------------|-------------|------|
| TEST REQUESTED | DETECTION LIMIT | RESULTS     | FLAG |
| Lead /1        | 0.0020 mg/L     | 0.0017 mg/L | J ·  |

Dilution Factor: 1

Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD

QC Batch No : AC160-35F

DATE RECEIVED : 12-JUL-1997

REPORT · NUMBER : D97-8703-10

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABOC#

: LB1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 12-JUL-1997

QC Batch No : 32-0721971

| TEST REQUESTED |    | DETECTION LIMIT |   | DECIN TO  | T =  |
|----------------|----|-----------------|---|-----------|------|
|                |    | DETECTION LIMIT |   | RESULTS   | FLAG |
| Sulfate        | /1 | 0.20 mg/L       | < | 0.20 mg/L | U .  |

· DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-11

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABOC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 12-JUL-1997

PREPARATION METHOD: EPA 5030
PREPARED BY: MGD
PREPARED ON: 17-JUL-1997
ANALYSIS METHOD: EPA 8260 /1
ANALYZED BY: MGD
ANALYZED ON: 17-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    |                 |           |      |
|----------------------|-----------------|-----------|------|
| TEST REQUESTED       | DETECTION LIMIT | RESULTS   | FLAG |
| Acetone              | 20.0 μg/L       | 59.8 μg/L |      |
| Acrylonitrile        | 5.00 · μg/L···  | 31.2 μg/L |      |
| Benzene              | 5.00 µg/L       | 44.5 μg/L |      |
| Bromobenzene         | 5.00 μg/L       | 46.1 μg/L |      |
| Bromochloromethane   | 5.00 μg/L       | 43.4 μg/L |      |
| Bromodichloromethane | 5.00 μg/L       | 39.2 μg/L |      |
| Bromoform            | 5.00 μg/L       | 29.3 μg/L |      |
| Carbon disulfide     | 5.00 μg/L       | 39.8 μg/L |      |
| Carbon tetrachloride | 5.00 µg/L       | 41.9 μg/L |      |
| Chlorobenzene        | 5.00 µg/L       | 46.5 μg/L |      |
| Chloroethane         | 5.00 μg/L       | 52.2 μg/L |      |
| Chloroform           | 5.00 μg/L       | 43.8 μg/L |      |
| 2-Chlorotoluene      | 5.00 μg/L       | 53.6 μg/L |      |
| 4-Chlorotoluene      | 5.00 μg/L       | 45.6 μg/L |      |

REPORT NUMBER : D97-8703-11 · ANALYSIS METHOD : EPA 8260 /1

| VOLATILE ORGANICS           |           |       |         |      |                |
|-----------------------------|-----------|-------|---------|------|----------------|
| TEST REQUESTED              | DETECTION | LIMIT | RESULTS |      | FLAG           |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | 46.3    | μg/L |                |
| Dibromochloromethane        | 5.00      | μg/L  | 36.0    | μg/L |                |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | 16.5    | μg/L | J              |
| 1,2-Dibromoethane           | 5.00      | μg/L  | 43.1    | μg/L |                |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | 44.5    | μg/L |                |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | 43.4    | μg/L |                |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | 42.2    | μg/L |                |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | 50.8    | μg/L | ı              |
| 1,1-Dichloroethane          | 5.00      | μg/L  | 43.7    | μg/L |                |
| 1,2-Dichloroethane          | 5.00      | μg/L  | 44.4    | μg/L |                |
| 1,1-Dichloroethene          | 5.00      | μg/L  | 44.9    | μg/L |                |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | 41.4    | μg/L |                |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | 42.9    | μg/L |                |
| 1,2-Dichloropropane         | 5.00      | μg/L  | 46.3    | μg/L |                |
| 2,2-Dichloropropane         | 5.00      | μg/L  | 46.4    | μg/L |                |
| 1,1-Dichloropropene         | 5.00      | μg/L  | 44.9    | μg/L |                |
| 1,3-Dichloropropane         | 5.00      | μg/L  | 46.8    | μg/L |                |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | 39.8    | μg/L |                |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | 38.6    | μg/L |                |
| Ethylbenzene                | 5.00      | μg/L  | 83.6    | μg/L |                |
| 2-Hexanone                  | 50.0      | μg/L  | 43.2    | μg/L | J              |
| 8romomethane                | 5.00      | μg/L  | 43.5    | μg/L |                |
| Chloromethane               | 5.00      | μg/L  | 59.8    | μg/L | <del>-  </del> |
| Dibromomethane              | 5.00      | μg/L  | 43.9    | μg/L |                |
| 2-Butanone                  | 100       | μg/L  | 41.0    | μg/L | J              |
| Iodomethane                 | 5.00      | μg/L  | 45.4    | μg/L |                |

REPORT NUMBER : D97-8703-11 · ANALYSIS METHOD : EPA 8260 /1

| VOLATILE ORGANICS          |           |       |        |      |      |
|----------------------------|-----------|-------|--------|------|------|
| TEST REQUESTED             | DETECTION | LIMIT | RESULT | S    | FLAG |
| Methylene chloride         | 5.00      | μg/L  | 44.3   | μg/L |      |
| 4-Methyl-2-pentanone       | 100       | μg/L  | 34.9   | μg/L | J    |
| Styrene                    | 5.00      | μg/L  | 40.2   | μg/L |      |
| 1,1,1,2-Tetrachloroethane  | 5.00      | μg/L  | 42.8   | μg/L |      |
| 1,1,2,2-Tetrachloroethane  | 5.00      | μg/L  | 40.4   | μg/L |      |
| Tetrachloroethene          | 5.00      | μg/L  | 48.6   | μg/L |      |
| Toluene                    | 5.00      | μg/L  | 43.0   | μg/L |      |
| 1,2,3-Trichlorobenzene     | 5.00      | μg/L  | 177    | μg/L |      |
| 1,2,4-Trichlorobenzene     | 5.00      | μg/L  | 50.4   | μg/L |      |
| 1,1,1-Trichloroethane      | 5.00      | μg/L  | 44.6   | μg/L |      |
| 1,1,2-Trichloroethane      | 5.00      | μg/L  | 42.5   | μg/L |      |
| Trichloroethene            | 5.00      | μg/L  | 44.6   | μg/L |      |
| Trichlorofluoromethane     | 5.00      | μg/L  | 50.7   | μg/L |      |
| 1,2,3-Trichloropropane     | 5.00      | μg/L  | 45.0   | μg/L |      |
| 1,3,5-Trimethylbenzene     | 5.00      | μg/L  | 45.5   | μg/L |      |
| 1,2,4-Trimethylbenzene     | 5.00      | μg/L  | 44.6   | μg/L |      |
| Vinyl acetate              | 50.0      | μg/L  | 17.4   | μg/L | J    |
| Vinyl chloride             | 2.00      | μg/L  | 46.9   | μg/L |      |
| m,p-Xylene                 | 5.00      | μg/L  | 85.1   | μg/L |      |
| o-Xylene                   | 5.00      | μg/L  | 42.9   | μg/L |      |
| Toluene-d8 (SS)            |           |       | 44.7   | μg/L |      |
| Bromofluorobenzene (SS)    |           |       | 51.3   | μg/L |      |
| 1,2-Dichloroethane-d4 (SS) |           |       | 47.0   | μg/L |      |
| Dibromofluoromethane (SS)  |           |       | 47.1   | μg/L |      |

DATE RECEIVED : 12-JUL-1997 · REPORT NUMBER : D97-8703-11

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 12-JUL-1997

ANALYZED BY : MGD
ANALYZED ON : 17-JUL-1997
ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR: 1

QC BATCH NO : 9707177001

| TENTATIVELY IDENTIFIED COMPOUNDS |                | •        |         |      |
|----------------------------------|----------------|----------|---------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT  | FLAG |
| No compounds detected above      |                | VOA      | 10 ug/L | N    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-11

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABOC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997 PREPARATION METHOD : EPA 3520B

PREPARED BY : TAP PREPARED ON : 16-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY: JXA
ANALYZED ON: 24-JUL-1997
DILUTION FACTOR: 1

METHOD FACTOR : 1

QC BATCH NO : AC142-74

| POLYNUCLEAR AROMATIC HYDROCARBONS |           |          |           |      |
|-----------------------------------|-----------|----------|-----------|------|
| TEST REQUESTED                    | DETECTION | LIMIT    | RESULTS   | FLAG |
| Acenaphthene                      | 18.0      | μg/L     | 83.3 μg/L |      |
| Acenaphthylene                    | 23.0      | µg/L···· | 81.5 Ag/L |      |
| Anthracene                        | 6.60      | μg/L     | 74.2 μg/L |      |
| Benzo(a)anthracene                | 0.130     | μg/L     | 94.0 µg/L |      |
| Benzo(a)pyrene                    | 0.120     | μg/L     | 91.0 μg/L |      |
| Benzo(b)fluoranthene              | 0.180     | μg/L     | 89.6 µg/L |      |
| Benzo(g,h,i)perylene              | 0.760     | μg/L     | 90.2 μg/L |      |
| Benzo(k)fluoranthene              | 0.170     | μg/L     | 86.2 μg/L |      |
| Chrysene                          | 1.50      | μg/L     | 89.0 μg/L |      |
| Dibenz(a,h)anthracene             | 0.300     | μg/L     | 97.6 μg/L |      |
| Fluoranthene                      | 2.10      | μg/L     | 91.7 µg/L |      |
| Fluorene                          | 2.10      | μg/L     | 86.0 μg/L |      |
| Indeno(1,2,3-cd)pyrene            | 0.430     | μg/L     | 83.8 μg/L |      |
| Naphthalene                       | 18.0      | μg/L     | 91.0 μg/L |      |

REPORT NUMBER : D97-8703-11 ANALYSIS METHOD : EPA 8310 PR /1

| POLYNUCLEAR AROMATIC HYDROCARBONS | 3               |           |      |
|-----------------------------------|-----------------|-----------|------|
| TEST REQUESTED                    | DETECTION LIMIT | RESULTS   | FLAG |
| Phenanthrene                      | 6.40 µg/L       | 82.3 µg/L |      |
| Pyrene                            | 2.70 µg/L       | 83.2 μg/L |      |
| p-Terphenyl (SS)                  |                 | 7.94 μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-11

REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 12-JUL-1997

PREPARATION METHOD: EPA 3510B
PREPARED BY: KDF
PREPARED ON: 16-JUL-1997
ANALYSIS METHOD: EPA 8015M /1
ANALYZED BY: VHL
ANALYZED ON: 17-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                 |             |      |
|--------------------------------|-----------------|-------------|------|
| TEST REQUESTED                 | DETECTION LIMIT | RESULTS     | FLAG |
| Total Extractable Hydrocarbons | 1000 μg/L       | 2380 μg/L   |      |
| Triacontane-(S3)··             |                 | 231··· μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-11

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS ID MARKS : LABQC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY: VHT

PREPARED ON: 20-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT ANALYZED ON : 20-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

OC BATCH NO: 29072097RB

| TOTAL VOLATILE HYDROCARBONS |                 |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| Total Volatile Hydrocarbons | 100 μg/L        | 430 µg/L  |      |
| Fluorobenzene-(SS)          |                 | 47.3 μg/t |      |

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-11

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997 ANALYSIS METHOD: RSK 175 /1
ANALYZED BY: LAJ
ANALYZED ON: 18-JUL-1997
DILUTION FACTOR: 1

METHOD FACTOR: 1

QC BATCH NO : F071897-1

| DISSOLVED GASES IN WATER |           |       |   |        |      |      |
|--------------------------|-----------|-------|---|--------|------|------|
| TEST REQUESTED           | DETECTION | LIMIT |   | RESULT | S    | FLAG |
| Methane                  | 0.5       | ррьм  |   | 3.9    | ррьы |      |
| Ethane                   | 0.5       | ррьм  |   | 7.8    | ррьы |      |
| Ethene                   | 0.5       | ррьм  | < | 0.5    | ррьы | U    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-11

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABOC#

: BS1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 12-JUL-1997

| TOTAL METALS   |    |                 |             |      |
|----------------|----|-----------------|-------------|------|
| TEST REQUESTED |    | DETECTION LIMIT | RESULTS     | FLAG |
| Lead           | /1 | 0.0020 mg/L     | 0.0201 mg/L | · .  |

Dilution Factor: 1

Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD

QC Batch No : AC160-35F

DATE RECEIVED: 12-JUL-1997 REPORT NUMBER: D97-8703-11

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BS1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 12-JUL-1997

| MISCELLANEOUS ANALYSES |    |                 |           |      |
|------------------------|----|-----------------|-----------|------|
| TEST REQUESTED         |    | DETECTION LIMIT | RESULTS   | FLAG |
| Sulfate                | /1 | 0.20 mg/L       | 3.09 mg/L |      |

Dilution Factor: 1

Analyzed using EPA 9056 on 21-JUL-1997 by LKD

QC Batch No : 32-0721971

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-12

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Ground Water for IRPIMS

ID MARKS : GU-GMW4#

: N2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 10-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : MGD PREPARED ON : 18-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 50 METHOD FACTOR: 1

OC BATCH NO : 9707187001

| VOLATILE ORGANICS          |          |          |        |      |      |
|----------------------------|----------|----------|--------|------|------|
| TEST REQUESTED             | DETECTIO | ON LIMIT | RESULT | S    | FLAG |
| Ethylbenzene               | 250      | μg/L     | 1730   | μg/L | D    |
| Toluene                    | 250      | ا/زىر    | 2450   | μg/L | 5    |
| 1,3,5-Trimethylbenzene     | 250      | μg/L     | 508    | μg/L | D    |
| 1,2,4-Trimethylbenzene     | 250      | μg/L     | 1380   | μg/L | D    |
| m,p-Xylene                 | 250      | μg/L     | 5530   | μg/L | D    |
| o-Xylene                   | 250      | μg/L     | 2810   | μg/L | D    |
| Toluene-d8 (SS)            |          | ·        | 50.4   | μg/L | D    |
| Bromofluorobenzene (SS)    |          |          | 60.8   | μg/L | D    |
| 1,2-Dichloroethane-d4 (SS) |          |          | 51.0   | μg/L | D    |
| Dibromotluorometnane (SS)  |          |          | 50.3   | μg/L | D    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-13

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc ADDRESS : 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: LB2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

PREPARATION METHOD: EPA 5030

PREPARED BY : MGD

PREPARED ON: 18-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD

ANALYZED ON: 18-JUL-1997

DILUTION FACTOR: 1

METHOD FACTOR : 1

OC BATCH NO : 9707187001

| VOLATILE ORGANICS    |           |                   |            |        |      |      |
|----------------------|-----------|-------------------|------------|--------|------|------|
| TEST REQUESTED       | DETECTION | LIMIT             |            | RESULT | S    | FLAG |
| Acetone              | 20.0      | μg/L              | <          | 20.0   | μg/L | U    |
| Acrylonitrile        | 5.00      | μ <u>y</u> /Ŀ··-· | <          | 5.00   | μg/L | ני   |
| Benzene              | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| Bromobenzene         | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| Bromochloromethane   | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| Bromodichloromethane | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| Bromoform            | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| Carbon disulfide     | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| Carbon tetrachloride | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| Chlorobenzene        | 5.00      | μg/L              | <b> </b> < | 5.00   | μg/L | U    |
| Chloroethane         | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| Chloroform           | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| 2-Chlorotoluene      | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |
| 4-Chlorotoluene      | 5.00      | μg/L              | <          | 5.00   | μg/L | U    |

REPORT NUMBER : D97-8703-13 ANALYSIS METHOD : EPA 8260 /1

| VOLATILE ORGANICS           |           |       |          |         |      |      |
|-----------------------------|-----------|-------|----------|---------|------|------|
| TEST REQUESTED              | DETECTION | LIMIT |          | RESULTS | 3    | FLAG |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L  | <        | 10.0    | μg/L | U    |
| Dibromochloromethane        | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | <        | 25.0    | μg/L | U    |
| 1,2-Dibromoethane           | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | <b>~</b> | 5.00    | μg/L | U    |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | <        | 100     | μg/L | U    |
| 1,1-Dichloroethane          | 5.00      | μg/L  | <b>~</b> | 5.00    | μg/L | U    |
| 1,2-Dichloroethane          | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 1,1-Dichloroethene          | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 1,2-Dichloropropane         | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 2,2-Dichloropropane         | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 1,1-Dichloropropene         | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 1,3-Dichloropropane         | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| Ethylbenzene                | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 2-Hexanone                  | 50.0      | μg/L  | <        | 50.0    | μg/L | υ    |
| Bromomethane                | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| Chloromethane               | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| Dibromomethane              | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |
| 2-Butanone                  | 100       | μg/L  | <        | 100     | μg/L | U    |
| Iodomethane                 | 5.00      | μg/L  | <        | 5.00    | μg/L | U    |

REPORT NUMBER : D97-8703-13 ANALYSIS METHOD : EPA 8260 /1

| VOLATILE ORGANICS          |                 |   |         | ,             |      |
|----------------------------|-----------------|---|---------|---------------|------|
| TEST REQUESTED             | DETECTION LIMIT | r | RESULTS |               | FLAG |
| Methylene chloride         | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| 4-Methyl-2-pentanone       | 100 μg/L        | < | 100     | μg/L          | U    |
| Styrene                    | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| 1,1,1,2-Tetrachloroethane  | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| 1,1,2,2-Tetrachloroethane  | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| Tetrachloroethene          | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| Toluene                    | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| 1,2,3-Trichlorobenzene     | 5.00 μg/L       | < | 5.00    | μg/L          | u    |
| 1,2,4-Trichlorobenzene     | 5.00 μg/L       | < | 5.00    | μg/' <u>.</u> | U    |
| 1,1,1-Trichloroethane      | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| 1,1,2-Trichloroethane      | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| Trichloroethene            | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| Trichlorofluoromethane     | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| 1,2,3-Trichloropropane     | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| 1,3,5-Trimethylbenzene     | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| 1,2,4-Trimethylbenzene     | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| Vinyl acetate              | 50.0 μg/L       | < | 50.0    | μg/L          | U    |
| Vinyl chloride             | 2.00 μg/L       | < | 2.00    | μg/L          | U    |
| m,p-Xylene                 | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| o-Xylene                   | 5.00 μg/L       | < | 5.00    | μg/L          | U    |
| Toluene-d8 (SS)            |                 |   | 50.2    | μg/L          |      |
| Bromofluorobenzene (SS)    |                 |   | 58.5    | μg/L          |      |
| 1,2-Dichloroethane-d4 (SS) |                 | 1 | 49.7    | μg/L          |      |
| Dibromofluoromethane (SS)  |                 |   | 49.2    | μg/L          |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-13

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS ID MARKS : LABQC#

: LB2#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 12-JUL-1997

ANALYZED BY : MGD

ANALYZED ON : 18-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

METHOD FACTOR : 1

QC BATCH NO : 9707187001

| TENTATIVELY IDENTIFIED COMPOUNDS |                |          |                      | ·    |
|----------------------------------|----------------|----------|----------------------|------|
| COMPOUND                         | RETENTION TIME | FRACTION | RESULT               | FLAG |
| No compounds detected above      |                | VOA      | 10 ug/L [.] | N    |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-13

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: LB2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : CNA

PREPARED ON: 21-JUL-1997

ANALYSIS METHOD: EPA 5030/8015M /1 ANALYZED BY: VHT ANALYZED ON: 21-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 29072197RB

| TOTAL VOLATILE HYDROCARBONS | :               |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| Total Volatile Hydrocarbons | 100 μg/L        | 10.8 μg/L | J    |
| Fluorobenzene (SS)          |                 | 48.3 μg/L |      |

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-14

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BS2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGD

PREPARED ON: 18-JUL-1997 ANALYSIS METHOD : EPA 8260 /1

ANALYZED BY : MGD ANALYZED ON : 18-JUL-1997

DILUTION FACTOR: 1 METHOD FACTOR : 1

QC BATCH NO : 9707187001

| VOLATILE ORGANICS    |           |          |         |      |      |
|----------------------|-----------|----------|---------|------|------|
| TEST REQUESTED       | DETECTION | LIMIT    | RESULTS |      | FLAG |
| Acetone              | 20.0      | μg/L     | 66.8    | μg/L |      |
| Acrylonitrile        | 5.00      | μg/L ··· | 28.3    | μg/L |      |
| Benzene              | 5.00      | μg/L     | 51.4    | μg/L |      |
| Bromobenzene         | 5.00      | μg/L     | 55.3    | μg/L |      |
| Bromochloromethane   | 5.00      | μg/L     | 22.1    | μg/L |      |
| Bromodichloromethane | 5.00      | μg/L     | 43.0    | μg/L |      |
| Bromoform            | 5.00      | μg/L     | 32.0    | μg/L |      |
| Carbon disulfide     | 5.00      | μg/L     | 43.2    | μg/L |      |
| Carbon tetrachloride | 5.00      | μg/L     | 45.9    | μg/L |      |
| Chloropenzene        | >.00      | μg/L     | 53.8    | μg/L |      |
| Chloroethane         | 5.00      | μg/L     | 56.4    | μg/L |      |
| Chloroform           | 5.00      | μg/L     | 49.5    | μg/L |      |
| 2-Chlorotoluene      | 5.00      | μg/L     | 59.8    | μg/L |      |
| 4-Chlorotoluene      | 5.00      | μg/L     | 52.4    | μg/L |      |

REPORT NUMBER : D97-8703-14 ANALYSIS METHOD : EPA 8260 /1

| VOLATILE ORGANICS           |           |         |         |      |        |
|-----------------------------|-----------|---------|---------|------|--------|
| TEST REQUESTED              | DETECTION | N LIMIT | RESULTS | 3    | FLAG . |
| 2-Chloroethylvinyl ether    | 10.0      | μg/L    | 38.5    | μg/L |        |
| Dibromochloromethane        | 5.00      | μg/L    | 39.9    | μg/L |        |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L    | 41.9    | μg/L |        |
| 1.2-Dibromoethane           | 5.00      | μg/L    | 51.1    | μg/L |        |
| 1,2-Dichlorobenzene         | 5.00      | μg/L    | 50.1    | μg/L |        |
| 1,3-Dichtorobenzene         | 5.00      | μg/L    | 48.5    | μg/L |        |
| 1,4-Dichlorobenzene         | 5.00      | μg/L    | 49.4    | μg/L |        |
| trans-1,4-Dichloro-2-butene | 100       | μg/L    | 43.3    | μg/L | J      |
| 1,1-Dichloroethane          | 5.00      | μg/L    | 49.2    | μg/L |        |
| 1,2-Dichloroethane          | 5.00      | μg/L    | 50.4    | μg/L |        |
| 1,1-Dichloroethene          | 5.00      | μg/L    | 50.5    | μg/L |        |
| cis-1,2-Dichloroethene      | 5.00      | μg/L    | 48.0    | μg/L |        |
| trans-1,2-Dichloroethene    | 5.00      | μg/L    | 50.6    | μg/L |        |
| 1,2-Dichloropropane         | 5.00      | μg/L    | 38.5    | μg/L |        |
| 2,2-Dichloropropane         | 5.00      | μg/L    | 50.9    | μg/L |        |
| 1,1-Dichloropropene         | 5.00      | μg/L    | 50.6    | μg/L |        |
| 1,3-Dichloropropane         | 5.00      | μg/L    | 54.8    | μg/L |        |
| cis-1,3-Dichloropropene     | 5.00      | μg/L    | 45.4    | μg/L |        |
| trans-1,3-Dichloropropene   | 5.00      | μg/L    | 42.0    | μg/L |        |
| Ethylbenzene                | 5.00      | μg/L    | 93.6    | μg/L |        |
| 2-Hexanone                  | 50.0      | μg/L    | 60.6    | μg/L |        |
| Bromomethane                | 5.00      | μg/L    | 41.1    | μg/L |        |
| Chloromethane               | 5.00      | μg/L    | 64.4    | μg/L |        |
| Dibromomethane              | 5.00      | μg/L    | 50.2    | μg/L |        |
| 2-Butanone                  | 100       | μg/L    | 53.4    | μg/L | J      |
| Iodomethane                 | 5.00      | μg/L    | 39.9    | μg/L |        |

REPORT NUMBER : D97-8703-14 ANALYSIS METHOD : EPA 8260 /1

| TEST REQUESTED             | DETECTION L | IMIT | RESULT | s    | FLAG |
|----------------------------|-------------|------|--------|------|------|
| Methylene chloride         | 5.00 μς     | g/L  | 48.7   | μg/L |      |
| 4-Methyl-2-pentanone       | 100 д       | g/L  | 45.9   | μg/L | J    |
| Styrene                    | 5.00 μς     | g/L  | 45.9   | μg/L |      |
| 1,1,1,2-Tetrachlorcethane  | 5.00 μς     | g/L  | 48.0   | μg/L |      |
| 1,1,2,2-Tetrachloroethane  | 5.00 μς     | g/L  | 50.9   | μg/L |      |
| Tetrachloroethene          | 5.00 μς     | g/L  | 55.6   | μg/L |      |
| Toluene                    | 5.00 μς     | g/L  | 50.0   | μg/L |      |
| 1,2,3-Trichlorobenzene     | 5.00 μς     | g/L  | 241    | μg/L |      |
| 1,2,4-Trichlorobenzene     | 5.00 μς     | g/L  | 60.8   | μg/L |      |
| 1,1,1-Trichloroethane      | 5.00 μς     | g/L  | 48.9   | μg/L |      |
| 1,1,2-Trichloroethane      | 5.00 μς     | g/L  | 49.7   | μg/L |      |
| Trichloroethene            | 5.0υ μο     | g/L  | 63.6   | μg/L |      |
| Trichlorofluoromethane     | 5.00 μς     | g/L  | 55.4   | μg/L |      |
| 1,2,3-Trichloropropane     | 5.00 μς     | g/L  | 52.2   | μg/L |      |
| 1,3,5-Trimethylbenzene     | 5.00 μg     | g/L  | 51.2   | μg/L |      |
| 1,2,4-Trimethylbenzene     | 5.00 μς     | g/L  | 50.0   | μg/L |      |
| Vinyl acetate              | 50.0 μς     | g/L  | 19.4   | μg/L | J    |
| Vinyl chloride             | 2.00 μς     | g/L  | 52.0   | μg/L |      |
| m,p-Xylene                 | 5.00 да     | g/L  | 95.4   | μg/L |      |
| o-Xylene                   | 5.00 μς     | g/L  | 49.3   | μg/L |      |
| Toluene-d8 (SS)            |             |      | 50.8   | μg/L |      |
| Bromofluorobenzene (SS)    |             |      | 57.0   | μg/L |      |
| 1,2-Dichloroethane-d4 (SS) |             | j    | 51.8   | μg/L |      |
| Dibromofluoromethane (SS)  |             |      | 52.3   | μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER: D97-8703-14

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BS2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : CNA PREPARED ON : 21-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT ANALYZED ON : 21-JUL-1997

DILUTION FACTOR: 1

METHOD FACTOR : 1 QC BATCH NO : 29072197RB

| TOTAL VOLATILE HYDROCARBONS |                 |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| Total Volatile Hydrocarbons | 100 μg/L.       | 507 μg/L  |      |
| Fluorobenzene (SS)          |                 | 47.6 μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-15

REPORT DATE: 18-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABOC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGD
PREPARED ON : 17-JUL-1997 ANALYSIS METHOD : EPA 8260 /1 ANALYZED BY : MGD ANALYZED ON : 17-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : 9707177001

| VOLATILE ORGANICS    |                 |           |      |
|----------------------|-----------------|-----------|------|
| TEST REQUESTED       | DETECTION LIMIT | RESULTS   | FLAG |
| Acetone              | 20.0 μg/L       | 71.0 μg/L |      |
| Acrylonitrile        | 5.00 μg/L       | 36.9 μg/L |      |
| Benzene              | 5.00 μg/L       | 46.9 μg/L |      |
| Bromobenzene         | 5.00 μg/L       | 47.6 μg/L |      |
| Bromochloromethane   | 5.00 μg/L       | 48.4 μg/L |      |
| Bromodichloromethane | 5.00 μg/L       | 41.7 μg/L |      |
| Bromoform            | 5.00 μg/L       | 32.0 μg/L |      |
| Carbon disulfide     | 5.00 μg/L       | 43.9 μg/L |      |
| Carbon tetrachloride | 5.00 μg/L       | 42.8 μg/L |      |
| Chlorobenzene        | 5.00 μg/L       | 50.0 μg/L |      |
| Chloroethane         | 5,00 μg/L       | 54.9 μg/L |      |
| Chloroform           | 5.00 μg/L       | 47.5 μg/L |      |
| 2-Chlorotoluene      | 5.00 μg/L       | 47.8 μg/L |      |
| 4-Chlorotoluene      | 5.00 μg/L       | 50.2 μg/L |      |

REPORT NUMBER : D97-8703-15 ANALYSIS METHOD : EPA 8260 /1

| TEST REQUESTED              | DETECTION | LIMIT | RESULT |          | FLAG |
|-----------------------------|-----------|-------|--------|----------|------|
| 2-Chloroethylvinyl ether    | 10.0      |       | 49.2   | ·        | FLAG |
| Dibromochloromethane        |           | μg/L  |        | μg/L     |      |
|                             | 5.00      | μg/L  | 39.4   | μg/L     |      |
| 1,2-Dibromo-3-chloropropane | 25.0      | μg/L  | 45.1   | μg/L<br> |      |
| 1,2-Dibromoethane           | 5.00      | μg/L  | 46.4   | μg/L     |      |
| 1,2-Dichlorobenzene         | 5.00      | μg/L  | 48.5   | μg/L     |      |
| 1,3-Dichlorobenzene         | 5.00      | μg/L  | 47.4   | μg/L     |      |
| 1,4-Dichlorobenzene         | 5.00      | μg/L  | 44.9   | μg/L     |      |
| trans-1,4-Dichloro-2-butene | 100       | μg/L  | 43.3   | μg/L     | J    |
| 1,1-Dichloroethane          | 5.00      | μg/L  | 47.8   | μg/L     |      |
| 1,2-Dichloroethane          | 5.00      | μg/L  | 47.8   | μg/L     |      |
| 1,1-Dichloroethene          | 5.00      | μg/L  | 47.6   | μg/L     |      |
| cis-1,2-Dichloroethene      | 5.00      | μg/L  | 46.3   | μg/L     |      |
| trans-1,2-Dichloroethene    | 5.00      | μg/L  | 48.8   | μg/L     |      |
| 1,2-Dichloropropane         | 5.00      | μg/L  | 49.2   | μg/L     |      |
| 2,2-Dichloropropane         | 5.00      | μg/L  | 50.1   | μg/L     |      |
| 1,1-Dichloropropene         | 5.00      | μg/L  | 50.4   | μg/L     |      |
| 1,3-Dichloropropane         | 5.00      | μg/L  | 48.6   | μg/L     |      |
| cis-1,3-Dichloropropene     | 5.00      | μg/L  | 42.2   | μg/L     |      |
| trans-1,3-Dichloropropene   | 5.00      | μg/L  | 39.9   | μg/L     |      |
| Ethylbenzene                | 5.00      | μg/L  | 48.2   | μg/L     |      |
| 2-Hexanone                  | 50.0      | μg/L  | 43.3   | μg/L     | J    |
| Bromomethane                | 5.00      | μg/L  | 48.5   | μg/L     |      |
| Chloromethane               | 5.00      | μg/L  | 64.5   | μg/L     |      |
| Dibromomethane              | 5.00      | μg/L  | 45.7   | μg/L     |      |
| 2-Butanone                  | 100       | μg/L  | 45.4   | μg/L     | J    |
| Iodomethane                 | 5.00      | μg/L  | 49.8   | μg/L     |      |

REPORT NUMBER : D97-8703-15 ANALYSIS METHOD : EPA 8260 /1

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| VOLATILE ORGANICS          |                 |           |      |
|----------------------------|-----------------|-----------|------|
| TEST REQUESTED             | DETECTION LIMIT | RESULTS   | FLAG |
| Methylene chloride         | 5.00 μg/L       | 46.8 μg/L |      |
| 4-Methyl-2-pentanone       | 100 µg/L        | 39.2 μg/L | J    |
| Styrene                    | 5.00 μg/L       | 43.5 μg/L |      |
| 1,1,1,2-Tetrachloroethane  | 5.00 μg/L       | 46.2 μg/L |      |
| 1,1,2,2-Tetrachloroethane  | 5.00 μg/L       | 44.5 μg/L |      |
| Tetrachloroethene          | 5.00 μg/L       | 52.2 μg/L |      |
| Toluene                    | 5.00 μg/L       | 45.6 μg/L |      |
| 1,2,3-Trichlorobenzene     | 5.00 μg/L       | 276 μg/L  |      |
| 1,2,4-Trichlorobenzene     | 5.00 μg/L       | 65.2 μg/L |      |
| 1,1,1-Trichloroethane      | 5.00 μg/L       | 48.1 μg/L |      |
| 1,1,2-Trichloroethane      | 5.00 μg/L       | 46.0 μg/L |      |
| Trichloroethene            | 5.00 μg/L       | 48.5 μg/L |      |
| Trichlorofluoromethane     | 5.00 μg/L       | 54.5 μg/L |      |
| 1,2,3-Trichloropropane     | 5.00 μg/L       | 49.0 μg/L |      |
| 1,3,5-Trimethylbenzene     | 5.00 μg/L       | 48.4 μg/L |      |
| 1,2,4-Trimethylbenzene     | 5.00 μg/L       | 46.1 μg/L |      |
| Vinyl acetate              | 50.0 μg/L       | 21.8 μg/L | J    |
| Vinyl chloride             | 2.00 µg/L       | 51.0 μg/L |      |
| m,p-Xylene                 | 5.00 μg/L       | 87.0 μg/L |      |
| o-Xylene                   | 5.00 μg/L       | 46.7 μg/L |      |
| Toluene-d8 (SS)            |                 | 49.0 μg/L |      |
| Bromofluorobenzene (SS)    |                 | 55.5 μg/L |      |
| 1,2-Dichloroethane-d4 (SS) |                 | 51.6 μg/L |      |
| Dibromofluoromethane (SS)  |                 | 52.2 μg/L |      |

Intertek Testing Services NA Inc. 1089 East Collins Boulevard Richardson, TX 75081 Telephone (972) 238-5591 Fax (972) 238-5592

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-15 REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997 PREPARATION METHOD : EPA 3520B

PREPARED BY : GWG PREPARED ON : 16-JUL-1997 ANALYSIS METHOD : EPA 8310 PR /1

ANALYZED BY : JXA ANALYZED ON : 24-JUL-1997

DILUTION FACTOR : 1 METHOD FACTOR : 1

QC BATCH NO : AC142-74

| TEST REQUESTED         | DETECTION | DETECTION LIMIT |        |           | FLAG |
|------------------------|-----------|-----------------|--------|-----------|------|
| Acenaphthene           | 18.0      | μg/L            | 89.7   | μg/L      |      |
| Acenaphthylene         | 23.0      | μg/L···         | 88.4 - | " μ9/L" " |      |
| Anthracene             | 6.60      | μg/L            | 80.3   | μg/L      |      |
| Benzo(a)anthracene     | 0.130     | μg/L            | 102    | μg/L      |      |
| Benzo(a)pyrene         | 0.120     | μg/L            | 98.4   | μg/L      |      |
| Benzo(b)fluoranthene   | 0.180     | μg/L            | 96.9   | μg/L      |      |
| Benzo(g,h,i)perylene   | 0.760     | μg/L            | 97.9   | μg/L      |      |
| Benzo(k)fluoranthene   | 0.170     | μg/L            | 93.1   | μg/L      |      |
| Chrysene               | 1.50      | μg/L            | 96.2   | μg/L      |      |
| Dipenz(a,n)anthracene  | 0.300     | μg/L            | 106    | μg/L      |      |
| Fluoranthene           | 2.10      | μg/L            | 99.6   | μg/L      |      |
| fluorene               | 2.10      | μg/L            | 92.7   | μg/L      |      |
| Indeno(1,2,3-cd)pyrene | 0.430     | μg/L            | 90.6   | μg/L      |      |
| Naphthalene            | 18.0      | μg/L            | 100    | μg/L      |      |

REPORT NUMBER : D97-8703-15 ANALYSIS METHOD : EPA 8310 PR /1

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| POLYNUCLEAR AROMATIC HYDROCARBON | S               |           |      |
|----------------------------------|-----------------|-----------|------|
| TEST REQUESTED                   | DETECTION LIMIT | RESULTS   | FLAG |
| Phenanthrene                     | 6.40 μg/L       | 88.6 μg/L |      |
| Pyrene                           | 2.70 μg/L       | 90.4 μg/L |      |
| p-Terphenyl (SS)                 |                 | 8.62 µg/L |      |

DATE RECEIVED ·: 12-JUL-1997

REPORT NUMBER: D97-8703-15

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997 PREPARATION METHOD: EPA 3520B

PREPARED BY : KDF PREPARED ON : 16-JUL-1997

ANALYZED BY: VHL
ANALYZED BY: VHL
ANALYZED ON: 17-JUL-1997
DILUTION FACTOR: 1

METHOD FACTOR : 1

QC BATCH NO : AC142-77

| TOTAL EXTRACTABLE HYDROCARBONS |                 |     |         |      |      |
|--------------------------------|-----------------|-----|---------|------|------|
| TEST REQUESTED                 | DETECTION LIMIT |     | RESULTS |      | FLAG |
| Total Extractable Hydrocarbons | 1000 де         | g/L | 2150    | μg/L |      |
| Triacontane (SS)               |                 |     | 216     | μg/L |      |

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER ·: D97-8703-15

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX: Water Quality Control for IRPIMS

ID MARKS : LABOC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : CNA PREPARED ON : 21-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1

ANALYZED BY : VHT ANALYZED ON : 21-JUL-1997

DILUTION FACTOR: 1

METHOD FACTOR : 1 QC BATCH NO : 29072097RB

| TOTAL VOLATILE HYDROCARBONS |                 |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| Total Volatile Hydrocarbons | 100 µg/L        | 486 μg/L  |      |
| Fluorobenzene (SS)          |                 | 48.4 µg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-15 REPORT DATE : 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABOC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 12-JUL-1997 ANALYSIS METHOD : RSK 175 /1

ANALYZED BY: LAJ
ANALYZED ON: 18-JUL-1997
DILUTION FACTOR: 1
METHOD FACTOR: 1

QC BATCH NO : F071897-1

| DISSOLVED GASES IN WATER |           |               |   |     |      |      |
|--------------------------|-----------|---------------|---|-----|------|------|
| TEST REQUESTED           | DETECTION | LIMIT RESULTS |   |     | s    | FLAG |
| Methane                  | 0.5       | ррьм          |   | 3.7 | ppbw |      |
| Ethane                   | 0.5       | ррьм          |   | 7.4 | ррьм |      |
| Ethene                   | 0.5       | ррьм          | < | 0.5 | ррьи | U    |

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-15

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc.

ADDRESS : 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BD1#(0-0')

PROJECT: 726876.24120 Gunter Annex DATE SAMPLED: 12-JUL-1997

| TOTAL METALS   |    |                 |   | *************************************** |      |
|----------------|----|-----------------|---|-----------------------------------------|------|
| TEST REQUESTED |    | DETECTION LIMIT |   | RESULTS                                 | FLAG |
| Lead           | /1 | 0.0020 mg/L     | < | 0.0020 mg/L                             | u.   |

Dilution Factor: 1

Prepared using EPA 3015 on 17-JUL-1997 by CEL Analyzed using EPA 7421 on 22-JUL-1997 by GGD

QC Batch No : AC160-35F

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-15

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900 : Denver, CO 80290 ATTENTION: Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BD1#(0-0')
PROJECT : 726876.24120 Gunter Annex
DATE SAMPLED : 12-JUL-1997

| MISCELLANEOUS ANALYSES |    |                 |           |      |
|------------------------|----|-----------------|-----------|------|
| TEST REQUESTED         |    | DETECTION LIMIT | RESULTS   | FLAG |
| Sulfate                | /1 | 0.20 mg/L       | 3.15 mg/L |      |
| Dilution Factor - 1    |    |                 |           |      |

Dilution Factor : 1

Analyzed using EPA 9056 on 21-JUL-1997 by LKD

QC Batch No : 32-0721971

DATE RECEIVED : 12-JUL-1997 REPORT NUMBER : D97-8703-16

REPORT DATE: 18-AUG-1997

SAMPLE SUBMITTED BY: Parsons Engineering Science, Inc ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290

ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABOC#

: BD2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 22-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : MGD PREPARED ON : 18-JUL-1997

ANALYSIS METHOD: EPA 8260 /1
ANALYZED BY: MGD
ANALYZED ON: 18-JUL-1997
DILUTION FACTOR: 1

METHOD FACTOR : 1

QC BATCH NO : 9707187001

| VOLATILE ORGANICS    |                 |           |      |
|----------------------|-----------------|-----------|------|
| TEST REQUESTED       | DETECTION LIMIT | RESULTS   | FLAG |
| Acetone              | 20.0 μg/L       | 92.2 µg/L |      |
| Acrylonitrile        | 5.00 μg/L       | 26.0 дд/L |      |
| Benzene              | 5.00 μg/L       | 51.1 μg/L |      |
| Bromobenzene         | 5.00 μg/L       | 53.4 μg/L | _    |
| Bromochloromethane   | 5.00 μg/L       | 49.5 μg/L |      |
| Bromodichloromethane | 5.00 μg/L       | 43.3 μg/L |      |
| Bromoform            | 5.00 μg/L       | 31.9 μg/L |      |
| Carbon disulfide     | 5.00 μg/L       | 44.8 μg/L |      |
| Carbon tetrachloride | 5.00 μg/L       | 45.7 μg/L |      |
| Chlorobenzene        | 5.00 μg/L       | 54.3 μg/L |      |
| Chloroethane         | 5.00 μg/L       | 58.2 μg/L |      |
| Chloroform           | 5.00 μg/L       | 49.2 μg/L |      |
| 2-Chlorotoluene      | 5.00 μg/L       | 60.9 μg/L |      |
| 4-Chlorotoluene      | 5.00 μg/L       | 53.0 μg/L |      |

Intertek Testing Services NA Inc. 1089 East Collins Boulevard Richardson, TX 75081 Telephone (972) 238-5591 Fax (972) 238-5592

REPORT NUMBER : D97-8703-16 ANALYSIS METHOD : EPA 8260 /1

| VOLATILE ORGANICS           |                 |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| 2-Chloroethylvinyl ether    | 10.0 μg/L       | 53.3 μg/L |      |
| Dibromochloromethane        | 5.00 μg/L       | 40.5 μg/L |      |
| 1,2-Dibromo-3-chloropropane | 25.0 μg/L       | 47.4 μg/L |      |
| 1,2-Dibromoethane           | 5.00 μg/L       | 53.2 μg/L |      |
| 1,2-Dichlorobenzene         | 5.00 μg/L       | 51.8 μg/L |      |
| 1,3-Dichlorobenzene         | 5.00 μg/L       | 52.5 μg/L |      |
| 1,4-Dichlorobenzene         | 5.00 μg/L       | 48.2 μg/L |      |
| trans-1,4-Dichloro-2-butene | 100 μg/L        | 54.2 μg/L | J    |
| 1,1-Dichloroethane          | 5.00 μg/L       | 50.8 μg/L |      |
| 1,2-Dichloroethane          | 5.00 μg/L       | 51.5 μg/L |      |
| 1,1-Dichloroethene          | 5.00 μg/L       | 53.1 μg/L |      |
| cis-1,2-Dichloroethene      | 5.00 μg/L       | 49.7 μg/L |      |
| trans-1,2-Dichloroethene    | 5.00 μg/L       | 51.1 μg/L |      |
| 1,2-Dichloropropane         | 5.00 μg/L       | 53.3 μg/L |      |
| 2,2-Dichloropropane         | 5.00 μg/L       | 23.6 μg/L |      |
| 1,1-Dichloropropene         | 5.00 μg/L       | 59.3 μg/L |      |
| 1,3-Dichloropropane         | 5.00 μg/L       | 53.6 µg/L |      |
| cis-1,3-Dichloropropene     | 5.00 μg/L       | 45.2 μg/L |      |
| trans-1,3-Dichloropropene   | 5.00 μg/L       | 43.1 μg/L |      |
| Ethylbenzene                | 5.00 μg/L       | 96.8 μg/L |      |
| 2-Hexanone                  | 50.0 μg/L       | 61.4 µg/L |      |
| Bromomethane                | 5.00 μg/L       | 43.8 μg/L |      |
| Chloromethane               | 5.00 μg/L       | 69.9 μg/L |      |
| Dibromomethane              | 5.00 μg/L       | 50.1 μg/L |      |
| 2-Butanone                  | 100 μg/L        | 60.9 μg/L | J    |
| Iodomethane                 | 5.00 μg/L       | 39.5 μg/L |      |

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| VOLATILE ORGANICS          |                 |           |      |
|----------------------------|-----------------|-----------|------|
| TEST REQUESTED             | DETECTION LIMIT | RESULTS   | FLAG |
| Methylene chloride         | 5.00 μg/L       | 50.2 μg/L |      |
| 4-Methyl-2-pentanone       | 100 μg/L        | 49.3 μg/L | J    |
| Styrene                    | 5.00 μg/L       | 45.6 μg/L |      |
| 1,1,1,2-Tetrachloroethane  | 5.00 μg/L       | 48.6 μg/L |      |
| 1,1,2,2-Tetrachloroethane  | 5.00 μg/L       | 51.7 μg/L | _    |
| Tetrachloroethene          | 5.00 μg/L       | 53.5 μg/L |      |
| Toluene                    | 5.00 μg/L       | 50.2 μg/L |      |
| 1,2,3-Trichlorobenzene     | 5.00 μg/L       | 309 μg/L  |      |
| 1,2,4-Trichlorobenzene     | 5.00 μg/L       | 68.9 μg/L |      |
| 1,1,1-Trichloroethane      | 5.00 μg/L       | 50.6 μg/L |      |
| 1,1,2-Trichloroethane      | 5.00 μg/L       | 49.8 μg/L |      |
| Trichloroethene            | 5.00 μg/L       | 61.0 μg/L |      |
| Trichlorofluoromethane     | 5.00 μg/L       | 55.6 μg/L |      |
| 1,2,3-Trichloropropane     | 5.00 μg/L       | 60.1 μg/L |      |
| 1,3,5-Trimethylbenzene     | 5.00 μg/L       | 51.4 μg/L |      |
| 1,2,4-Trimethylbenzene     | 5.00 μg/L       | 49.9 μg/L |      |
| Vinyl acetate              | 50.0 μg/L       | 13.2 μg/L | J    |
| Vinyl chloride             | 2.00 µg/L       | 53.7 μg/L |      |
| m,p-Xylene                 | 5.00 μg/L       | 98.5 μg/L |      |
| o-Xylene                   | 5.00 μg/L       | 51.3 μg/L |      |
| Toluene-d8 (SS)            |                 | 52.9 μg/L |      |
| Bromofluorobenzene (SS)    |                 | 55.2 μg/L |      |
| 1,2-Dichloroethane-d4 (SS) |                 | 53.0 μg/L |      |
| Dibromofluoromethane (SS)  |                 | 51.6 μg/L |      |

DATE RECEIVED : 12-JUL-1997

REPORT NUMBER : D97-8703-16

REPORT DATE: 14-AUG-1997

SAMPLE SUBMITTED BY : Parsons Engineering Science, Inc

ADDRESS: 1700 Broadway, Ste. 900

: Denver, CO 80290 ATTENTION : Mr. John Hall

SAMPLE MATRIX : Water Quality Control for IRPIMS

ID MARKS : LABQC#

: BD2#(0-0')

PROJECT: 726876.24120 Gunter Annex

DATE SAMPLED : 22-JUL-1997

PREPARATION METHOD : EPA 5030

PREPARED BY : CNA

PREPARED ON : 22-JUL-1997

ANALYSIS METHOD : EPA 5030/8015M /1 ANALYZED BY : VHT

ANALYZED ON: 22-JUL-1997

DILUTION FACTOR: 1

METHOD FACTOR : 1 QC BATCH NO : 29072197RB

| TOTAL VOLATILE HYDROCARBONS |                 |           |      |
|-----------------------------|-----------------|-----------|------|
| TEST REQUESTED              | DETECTION LIMIT | RESULTS   | FLAG |
| Total Volatile Hydrocarbons | 100 μg/L        | 464 µg/L  |      |
| Fluorobenzene (38)          |                 | 47.5 µg/L |      |

#### DESCRIPTION OF REPORTING FLAGS

- U Indicates compound was analyzed for but not detected.
- J Indicates an estimated value. This flag is used if the compound is detected but is below the Reporting Limit.
- D Indicates all compounds in an analysis at a secondary dilution.
- N Indicates presumptive evidence of a compound. This flag is only used for tentatively identified compounds where the identification is based on a mass spectral library search.
- E Indicates the compounds whose concentration exceed the limit of the instrument or the Laboratory Information Management System. The concentration will be greater than the concentration listed.
- Q Indicates the surrogate recovery is outside the defined QC limits.
- M Indicates the matrix has interfered with the recovery of the surrogates.
- O Indicates the surrogate was lost because of dilution.